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ABSTRACT

A study investigating the influence of certain features of cohesion and coherence on Israeli college students' difficulty in reading English expository texts examined the reader's ability to understand sequences of propositions and familiarity with markers of cohesion. Three methods were used to investigate the problem: application of a readability formula to the texts, several reading comprehension tests of original and altered versions of texts, and discourse analysis. The subjects were 3,600 freshmen at Haifa University attending a required English reading comprehension course. The students' native languages were generally Hebrew and Arabic, and most of them had had seven or eight years of English instruction. The readability formula and discourse analysis were applied to the texts used, and the comprehension tests were administered as a regular part of the course. The findings emphasize the importance of context in reading comprehension by showing that difficulties are not limited to lexical items but are related to the connection between ideas in sentences and paragraphs. Improved instruction in recognition of markers of cohesion and increased focus on relationships between sentences are recommended. (MSE)

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# Aspects of Cohesion and Coherence in Context: Investigating Causes of Difficulty for Israeli University Students Reading Texts in English

Thesis submitted for the Degree
"DOCTOR OF PHILOSOPHY"
by Marsha Bensoussan

Submitted to the Senate of the Hebrew University on June 10, 1984

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This work was carried out under the supervision of

Professor Andrew D. Cohen and

Professor Edward A. Levenston

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# Aspects of Cohesion and Coherence in Context: Investigating Causes of Difficulty for Israeli University Students Reading Texts in English

Marsha Bensoussan

## CHAPTER ONE

## PROBLEMS OF ISRAELI UNIVERSITY STUDENTS IN READING ENGLISH

### A. IDENTIFYING FACTORS CAUSING TEXT DIFFICULTY

First-year students at Israeli universities are required to read many of the same academic articles and texts in English as any freshman college student would be reading in the USA or England. Some of these texts are difficult for students who are native speakers of English. The difficulties are compounded for our students, for whom English may be their second language (for native speakers of Hebrew) or third (for native speakers of Arabic).

It is not clear why students find certain texts more difficult than others. Many teachers and students believe that having a limited vocabulary is a major obstacle to reading comprehension. Yet it is possible to understand every word separately in a sentence without understanding either the meaning of the sentence as a whole or its function in the text.

Early research tried to measure text difficulty by using readability formulas, quantifying the surface structure of samples of the text by means of factors such as word length and sentence length. Although these readability formulas solved the problem of quantifying the variety of factors in a text, they did not really explain these factors. Nor were the formulas reliable for advanced texts in English. One of the shortcomings of readability formulas is that they cannot explain why certain texts would be difficult for some readers, but relatively easy for others.

More recent research in psycholinguistics examines the structure and content of the whole text or discourse rather than selected samples of it. Those aspects of a series of sentences or utterances which cause it to be seen as a whole connected discourse are said to give it 'coherence.' Most of these aspects are implicit in the text, without special signalling. For the purposes of this study, only one aspect of coherence will be investigated: the aspect dealing with the way in which a written discourse is shaped by the sequencing of its sentences. The meaning and rhetorical function, or illocutionary force, of a sentence may be affected by the meaning of sentences preceding and following it, or by its placement in the discourse (i.e., The weight of a sentence may differ depending on whether it appears at the beginning or the end of the discourse.

To understand the meaning of a sentence in context, readers need to arrive at an understanding of the coherence of the text -- the reasoning behind the purpose and placement of a particular sentence in the text. A closer look at the larger context preceding and following a problematic sentence yields more information about the content and author's intentions in the text.

Sometimes the links between ideas in a discourse are overtly signalled (e.g., pronouns, repetition, synonyms). The writer explicitly states the connection between sentences by words which serve as signposts of the structure of the discourse. Such words are termed markers of 'cohesion.' Examining the sentences for markers of cohesion may help readers to a certain extent.

The terms 'coherence' and 'cohesion' will be used in this study as points of reference in a discussion of reading difficulty. It must be borne in mind that these terms will be used as a kind of shorthand since this study will deal only with selected aspects of coherence (sequencing of information) and cohesion (reference, substitution, ellipsis, and lexical cohesion). It is assumed that in order to comprehend a text, students must know not only the meaning of the separate words but also have a sense of how the text coheres as a whole and what cohesive devices the writer uses to signal organization of the information.

The extent to which advanced readers at the university level are capable of understanding the coherence and cohesion of a text will be investigated in this study. A diagnosis of areas of difficulty would examine whether a student has understood the relations between words, between sentences, between paragraphs, and among ideas in the text as a whole.

There are other, non-linguistic, factors that need to be taken into account. Inasmuch as reading comprehension depends on the reader as much as it does the text, the specific problems of Israeli students will also be examined as causes of difficulty. Recent research assumes that readers come to a text with certain expectations. Thus if a certain text does not fulfill readers' expectations, then they may find the passage difficult to read and understand.

This study will deal only with expository texts, a text-type with which univerity students are familiar from their Hebrew studies. Although fluent readers may know what to expect from an expository text on the macro- (i.e., global, whole-text) level which includes ideas and the facts and examples which the writer uses to prove his argument(s), students do not necessarily know what to expect on the micro- (i.e., paragraph, sentence, and word) level. According to this reasoning, the problems for Israeli students may be lack of familiarity with the conventions and organization of English prose (coherence and cohesion of the discourse), as well as unfamiliarity with the vocabulary in any given text.

## B. TEACHER AND STUDENT ATTITUDES TOWARD COHERENCE AND COHESION

### 1. Previous Research on Opinions of What Makes Texts Difficult

#### a. EFL Student Opinions

Researchers in the field of reading comprehension for students of English as a Foreign Language (EFL) asked the opinions of their students, and there was agreement as to the cause of greatest difficulty: by far the most students believed that their main obstacle to reading comprehension was lack of vocabulary (Yorio 1971, Gorman 1979, Sim 1979).

There was disagreement, however, concerning what students saw as their next worst problem. Gorman (1979) quoted research pointing to problems with syntax. Sim (1979) found that many students complained about difficulty with sentence structure and length. Another group of students questioned by Sim (1979), however, complained that they had difficulty following ideas because they did not always see how these were joined. Yorio (1971) also found that, as the second greatest problem, students feared that they too easily lost the thread of an argument. For these two groups of students, then, sentence structure may not be as much of a problem as the connection between sentences.

Other problems noted by students were interference by the native language (Yorio 1971); style, level of abstraction, content of subject matter, and text length (Sim 1979); and rate of reading (Gorman 1979).

### b. Lecturers' Opinions

Sim (1979) also questioned lecturers in the Department of Sociology as to what they thought were the major causes of reading difficulty for their students. Again vocabulary was seen as the leading obstacle to reading comprehension.

### 2. Questionnaires at Haifa University (For a copy of the Questionnaire, see Appendix A)

Before carrying out the empirical studies, I took a preliminary survey to learn the opinions of students and teachers of EFL at Haifa University (and by implication, other Israeli EFL students and their teachers at the university level) concerning certain aspects of coherence and cohesion more specifically. In particular, we were interested in three features which will be examined in detail:

1. inference, implication (B9) --indirect illocutionary force
2. contextually synonymous paraphrase (C2) -- lexical cohesion: recognition of word, paragraph equivalents
3. reference (D4) -- grammatical cohesion

Inference/implication (indirect illocutionary force) is one aspect of coherence, synonyous paraphrase is one aspect of lexical cohesion, and reference is one aspect of grammatical cohesion. Thus each of these features represents one of the aspects with which this study will deal. A questionnaire was distributed for students and teachers of all levels of English courses, ranging from the Pre-Academic Unit to the Department of Foreign Languages. The questionnaire consisted of a checklist of features causing difficulty in reading comprehension. The three items of special interest were included in a total list of 41 items which appeared under six headings: Graphic Organization, Rhetorical Devices or Argumentation, Vocabulary, Syntax and Grammar, Author's Involvement in the Text,[1] and the Reader's Attitude and Self-Confidence. EFL students and teachers were asked to rate the six headings both in order of importance and in order of difficulty. In addition, they were asked whether or not each of the 41 items was taught, was seen as important, and was considered to cause difficulty in reading.

### a. EFL Students' Opinions

Results were obtained from 105 students of EFL: 67 studying in the required English course in the Department of Foreign Languages and 38 at the Pre-Academic level (21 B level and 17 C level students). They answered questionnaires written in English. Terms that were not clearly understood were translated to the class orally by the researcher or teacher who administered the questionnaires. Students differed in their opinions of which features were more important and more difficult. The hierarchies are shown in Tables 1 - 4, Appendix A.

In general, students rated difficult and important features almost in the same order. The three features seen as easier (i.e., author's involvement, reader's attitude, and graphic organization) were also seen as less important. On the other hand, there was some discrepancy for the features seen as more difficult and more important. Vocabulary was viewed as most difficult by all students, but most important by only the weaker ones. For the more proficient, vocabulary was second in importance to syntax/grammar (including reference). Rhetorical function, considered second most difficult, rated third in importance. Syntax/grammar rated third in difficulty but higher in importance.

Focusng on the three features of lexical cohesion, grammatical cohesion, and indirect illocutionary force, we came to the following conclusions:

1. These features were taught in class with varying frequency.

2. These features were believed essential to reading comprehension by more than half the EFL Pre-Academic students and important but not essential by more than half the Required Course students.

3. These features were considered either extremely or fairly difficult (except for synonymous parahrase, which one-third of the Required Course students found fairly easy).

4. Although syntax/grammar (reference) was believed difficult, students did not perceive this feature as being taught in class often.

In short, students perceived these features as being both fairly difficult and important for reading. Yet students did not see these features as being particularly emphasized in class. The fact that students believed these features to be difficult and important in the reading process indicated that an investigation of these topics would be worthwhile. The fact that such features were not seen as being emphasized in the classroom was puzzling. It implied either that teachers did not view these features as important and/or difficult, or else that students did not notice when these features were taught. Questionnaires were therefore also distributed to EFL teachers.

### b. EFL Teachers' Opinions

Results were obtained from 16 teachers of EFL: ten in the Pre- Academic Unit, six in the Department of Foreign Languages, and one teacher of student-teachers of EFL in the Department of Education, Haifa University.[2]

Of the three features examined on the questionnaire (inference/implication, synonymous paraphrase, and reference), the following results were obtained:

1. These features were always taught in class.

2. These features were believed to be essential to reading comprehension by more than half the teachers.

3. Implication/inference (indirect illocutionary force) was considered extremely difficult by teachers of the weaker classes. Teachers of more advanced classes considered it to be only fairly difficult for students.

4. Opinion concerning the other two features was split between fairly difficult and fairly easy. That is, although many of the teachers saw features of cohesion important enough to teach in class, they did not perceive these features as specific causes of reading difficulty.

5. Vocabulary and Syntax/Grammar were considered to have the same level of difficulty and to be of equal importance.

In short, although many EFL teachers perceived these features as being essential to reading comprehension, they did not necessarily believe these features to impede comprehension. And they claimed to always teach these features in class. Thus EFL students and teachers differed as to how they perceived these features in terms of difficulty, importance, and classroom attention.

### c. Discrepancies between Views of EFL Students and Teachers

An examination of these tables shows that there are discrepancies between which features EFL students and teachers perceive as difficult, as important, and as being emphasized in the classroom.

1. Whereas students viewed vocabulary as most difficult, teachers placed it lower down the hierarchy.

2. Students saw author's involvement as not so difficult, whereas it was the most difficult feature, according to EFL teachers.

3. Many teachers recognized the importance of the reader's attitude and self-confidence in the classroom, whereas for students it was at the bottom of the hierarchy.

4. Although teachers believed that certain features were always taught in class, students perceived them as only appearing often or sometimes in the lessons.

5. Students believed features of coherence and cohesion more difficult than teachers considered them to be.

6. Students considered vocabulary more difficult than syntax/grammar, whereas teachers considered them to be on the same level of difficulty.

These findings underscore a point that we suspected at the beginning of the research. Although EFL teachers recognize the importance of certain aspects of cohesion and coherence in reading comprehension, they may not believe that these features may be causes of difficulty. The students themselves, on the other hand, appear to see them as troublemakers. This study will investigate whether these features cause difficulty and, if so, will suggest means by which EFL teachers can help their students overcome these obstacles to comprehension.

## C. AIMS OF THE PRESENT STUDY

One aim of this study will be to examine two aspects of discourse -- coherence and cohesion — using a number of texts to determine how and/or whether these features cause difficulty in reading comprehension for advanced Israeli students of EFL.

In addition, this study will examine alternative methods of evaluating difficulty of texts, and the advantages and disadvantages of each. One of the problems in discussing reading difficulty is that it cannot readily be quantified and measured. This research effort will rely on more than one experimental procedure in order to measure selected features of coherence and cohesion affecting reading difficulty. For example, multiple-choice questions will be asked about specific sections of text. If students have difficulty answering these questions, then the text will be examined to see whether the difficulty was due to any particular features of coherence or cohesion. A number of different approaches on a variety of texts will be used: a readability formula, multiple-choice comprehension questions, and modified rational cloze procedure.

## D. RESEARCH QUESTIONS

During the course of this study, the following questions will be investigated:

1. Is coherence a factor that may affect reading comprehension? Does a certain sequence of information cause more difficulty in comprehension than another?

We will examine the hypothesis that the sequence in which information appears may affect the reader's perception of rhetorical functions (see below, Illocutionary Acts, Chapter Two B.1.a.3), pp. 23-24). It is assumed that a text containing paragraphs developed according to a single line of thought is more likely to be more easily understood than a text containing shifting arguments and a variety of illocutionary acts and sentence functions. In other words, it is assumed that not only the words themselves but the way they are organized may cause difficulty in reading.

2. Do certain features of cohesion cause difficulty in reading comprehension? What is the relative importance of lexical as opposed to grammatical cohesion as obstacles to comprehension?

We will also investigate the hypothesis that when students ignore or misconstrue markers of grammatical cohesion, they will be likely to find the text more difficult than if they are able to use these cohesive clues. It is assumed that students will find it harder to read the shorter, denser, more concentrated version of a text which contains many items of grammatical cohesion, and will find it easier to read the longer version of the same text which contains mostly items of lexical cohesion. This assumption is made in spite of the fact that many of the items of lexical cohesion (e.g., synonyms, superordinates) may contain more varied and difficult vocabulary items than the version of text containing mostly items of grammatical cohesion (e.g., pronouns, ellipsis).

It is assumed that a text may be written and edited in various ways without changing the ideas presented in it. Alternative doctored versions were constructed for each text. Each version contained a large concentration of either items of grammatical or of lexical cohesion.

The independent variables in this study will be the doctored versions of text and the test questions. The dependent variables were the students' responses and total test scores.

## E. SIGNIFICANCE OF THE RESEARCH

This study will attempt to present researchers with a variety of measures which may help to evaluate textual difficulty. It will try to isolate and measure complex textual features causing difficulty which, by their very nature resist quantification, unlike factors such as the number of words per sentence.

Moreover, this study is intended to show the teacher of advanced EFL students which kinds of lexical or grammatical items are harder to understand than others, and how one aspect of coherence, the sequencing of ideas, may affect readability. This knowledge should help a teacher to determine the relative difficulty of a text before administering it to a group of students -- without having to pre-test the text or having to count syllables or words per sentence, as is necessary according to many of the present methods. Instead, the teacher would scan quickly for markers of cohesion or features of coherence.

The results of this study may also be used by others engaged in preparing graded EFL materials, such as test constructors and textbook writers. This study will apply some of the findings of discourse analysts (Beaugrande, Halliday, Hasan, Searle, van Dijk, and Widdowson) and psycholinguists (Bever, Carpenter, Carroll, Crothers, Garrod, Just, Kintsch, Sanford, Thorndyke, and Vipond) in an attempt to determine the significance of cohesion and coherence for these non-native speakers of English.

## NOTES TO CHAPTER ONE

1. The first five major categores were based on a checklist developed in the ESP seminar, English Department, the Hebrew University. The course was taught by Prof. Larry Selinker and Prof. Andrew Cohen during the academic year 1976-1977. The list was compiled by Profs. Selinker and Cohen and the participants (approximately 25) in the seminar. For the purposes of this study, many of the sub-headings were changed, and one major category was omitted and another added in its place.

In the Questionnaire the six subheadings of Author's Involvement in the Text were: purpose, audience, tone, degree of formality, which side of the argument (s)he is on (what argument?!), and evaluation and opinion. (See Appendix A.)

2. For contributing of their own time and that of their students, I wish to thank Eleanor Avinor, Ilana Bousso, Thilde Fox, Barbara Golan, Livia Goldenblatt, Melanie Kessler, Dr. Gita Kornfeld, Dr. Isabelle Kreindler, Edith Krieger, Sandy Simenhoz, Batia Laufer, Ruth Nicola, Dr. Donald Sim, Ruth Sim, Barbara Swirski, and Irma Zaslansky.

# CHAPTER TWO

# A REVIEW OF PREVIOUS LITERATURE AND A RATIONALE FOR THE PRESENT STUDY

This study will distinguish between two factors which affect text difficulty: the nature of the text and the capability of the reader. In Hasan's words, "A text is a social agent." (1977, p. 229) This study will focus on two of the factors affecting text difficulty: the reader and the text. We will describe how text difficulty is defined and measured in the literature, and the effect of coherence and cohesion on text difficulty. In Sections A (pp. 18-21) and B (pp.21-51) of this chapter, we will define the terms used in text analysis, focusing on speech act theory, discourse analysis, coherence, and cohesion, and produce a model of reading comprehension. In Section C (pp. 52-78), using these terms, we will discuss different hypotheses relating text analysis to the reading process. In Section D (pp. 79-96), we will describe methods used in the research to measure difficulty in reading comprehension.

## A. TEXT READABILITY

### 1. Difficulty of Quantifying and Measuring Reading Comprehension

One of the problems in discussing reading difficulty is that it may be quantified and measured in many ways. One reason for this is the very nature of the reading process itself which varies with readers and with the circumstances in which they read a text (Klare 1963, p. 177). Beaugrande (1980) states that natural language communication is by nature "fuzzy" (p. 3).

One way of approaching the subject of text difficulty is to equate it with the concept of readability.

## 2. Quantification of Readability by Reading Formulas

Readability formulas attempt to quantify and measure what are basically unquantifiable characteristics in a text: style, level of abstraction, difficulty of ideas (Dale and Chall 1948; Flesch 1950; Klare 1952, 1963).

More than thirty readability formulas are cited by Klare (1963). They are based on the following criteria:

a. word factor
    1) word length
    2) word familiarity
    3) grammatical classification
b. sentence length

It is claimed that these formulas are fairly accurate in rating texts according to grade level. Klare (1963) cites evidence of formula validity from three sources: comparison with Difficulty Indices on criterion passages, high correlations between formula scores on the same passage, and studies relating formula scores to some outside criteria of readability.

Bormuth (1966) claims:

> a single readability formula can be usd to predict difficulty for subjects at almost any level of reading ability. (p. 126)

He reports high correlations between readability formulas and cloze passages.

The formula that was chosen to be used in this study is the Flesch Reading Ease Readablity Formula (Klare 1963, pp. 23, 58-59). This formula is cited as being often used, easily applied, and having much research data available. The equation for this formula is as follows:

Reading Ease = 206.835 - .846 wl - 1.015 sl

wl = the number of syllables per 100 words

sl = the average number of words per sentence

This formula was applied to the first 100 words of each of the texts used in this study.

Readability formulas, however, deal only with the surface structure of a text (for discussion of disadvantages, see below D.1., pp. 79-83). The underlying textual relations between ideas in the text can be measured in other ways, especially since formulas are not very reliable on the advanced level.

A variety of methods will be used in this study to evaluate text readability. We will begin by discussing discourse analysis. Like the readability formulas, discourse analysis can be used to examine segments of text larger than the sentence. Unlike formulas, which reduce the readability of a text to a single number representing a grade level, discourse analysis is a technique whereby a text can be described in terms of various conceptual and structural elements.

## B. TEXT ORGANIZATION: DISCOURSE ANALYSIS

### 1. The Realization of Meaning as Text

### a. Meaning -- Speech Act Theory

### 1) Utterances

Meanings are communicated by utterances, which are defined by Fries (1954) as "the total span of talk of one person in a single conversation or discourse." Here the meaning of discourse is limited to a single exchange in conversation. Later linguists (Coulthard 1977, Widdowson 1978, 1979) speak of discourse as a series or sequence of utterances.

According to Corder (1973),

> utterances ... are situationally conditioned realizations of sentences. (p. 91)

Take, for example, the following sentence from Text 2 (see Appendix B):

(1) Last year the world's population passed 4 billion.

This sentence could be encountered either as a single independent utterance, or as part of an utterance in a larger context.

The linguistic meaning of utterances, according to Fries (1954), has two components: lexical and structural. Examining our sample sentence as a complete utterance, we find its meaning both from the individual word meanings and from the relations among these words in the sentence framework. Set in a different order, the same words would have a different (nonsense) effect:

The 4 billion population passed the world's last year.

Thus both lexical and structural meanings are vital to comprehension. Moreover, an utterance contains both propositional content and illocutionary force (see 2) Propositions and 3) Illocutionary Acts below).

### 2) Propositions

Van Dijk (1980) defines propositions as "conceptual structures that are the minimal bearers of truth or satisfaction" (p. 207). Clark and Clark (1977) note that propositional content is also called "ideational content" with one of three basic functions: to denote states or events; to denote facts about states or events; or to qualify parts of other propositions" (p. 29). For our sample sentence (1) above, the function of the propositional content is to denote a fact about the number of people in the world last year.

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### 3) Illocutionary Acts

The term "illocutionary act" in the lexicon of discourse analysis originated with Austin (1962) and Searle (1968, 1969). Some present day linguists equate illocutionary acts with speech acts (Brown 1976, Levy 1979, Bever and Townsend 1979), but speech acts usually appear in social contexts, whereas illocutionary acts often refer to written discourse.

Illocutionary force is seen by Widdowson (1979) to be the realization of the 'meaning potential' of the proposition expressed.

> Thus the illocutionary force of a particular utterance is seen to be a functional reflection of its intrinsic linguistic form. (p. 127)

Illocutionary force may also be considered as the function of speech acts (Brown 1976).

Looking again at our sample sentence (1), we may find a wide variety of possible illocutionary forces for this sentence, depending on the whole utterance or wider context. The sentence may be a dry statement of fact, a comparison between last year and previous years, a warning of impending danger, the cause for some effect mentioned elsewhere in the text, etc. The illocutionary force of an utterance depends on the writer's intention.

Together, propositional content and illocutionary force constitute the message of an utterance. According to Schlesinger (1977), "There are two aspects to the message conveyed by a speaker": the propositional contexts and communicative considerations including illocutionary force (p. 79). Widdowson (1979) explains:

> One needs to recognize that linguistic structures are expressive of certain propositions on the one hand and that they count as performances of certain illocutionary acts on the other. (pp. 119-120)

### 4) Discourse

Discourse has been defined by Marshall and Glock (1978-79) as "the linguistic term used to define any utterance, regardless of length, that is a complete unit of meaning and has cohesion or unity" (p. 14).

Widdowson (1978) explains how discourse involves propositions or illocutionary acts:

> The description of discourse involves in part the way propositions combine to form an ongoing development: but it also involves accounting for the illocutionary acts these propositions are used to perform, and how they are related to each other. (p. 27)

The deep structure of a message (referred to by Marshall and Glock (1978-79) as the semantic structure), defined as a sequence of utterances, can be analyzed either as a sequence of propositions or as as sequence of illocutionary acts; in each case the sequence of units is seen as discourse. Both the propositional content and the illocutionary force of a text are taken into account in a full analysis of discourse (Cicourel, 1980, p. 102). On the level of surface structure, however, we have sequences of sentences which combine into texts (van Dijk 1972, Coulthard 1977, Widdowson 1978 and 1979). This dichotomy between deep and surface structure is also made by Halliday (1978): "Meaning is encoded as wording; and wording, in turn, as speaking or writing" (p. 208). Thus meaning on the deep level becomes encoded and finally emerges on the surface level as speaking or writing.

### b. Meanings Encoded as Text

#### 1) Text

The term text has been defined in a number of ways. According to Halliday and Hasan (1976), "Any piece of language that is operational, functioning as a unity in some context of situation, constitutes a text" (p. 293). Halliday (1978) describes a text as:

> a kind of 'supersentence,' a linguistic unit that is in principle greater in size than a sentence but of the same kind. (p. 109)

Beaugrande (1980) defines a text not as a series of single sentences, but as "meaningful configurations of language intended to communicate" (p. 1). He continues by saying that a text is an "actual system" (p. 16) created from the potential language system. In the same vein, Halliday and Hasan (1976) explain: "A text does not CONSIST OF sentences, it is REALIZED BY, or encoded in, sentences" (p. 2). Halliday (1978) is more specific:

> A text is 'what is meant', selected from the total set of options that constitute what can be meant. In other words, text can be defined as actualized meaning potential. (p. 109)

## 2) Meanings and Their Surface Manifestations

A distinction is often made between meanings on the discourse level (e.g., ideas, utterances, propositions, deep structure) and their surface forms or manifestations in sentences or texts (Brown 1976, p. 387; Wilkins 1976, p. 10).

In a written text, utterances are realized in sentences. There is no one-to-one correspondence, however, between one utterance and one sentence (Brown 1976, Coulthard 1977, Clark and Clark 1977, Widdowson 1978 and 1979). (See above B.1.b.1), Text, p. 25.) Van Dijk (1972) explains the differences clearly:

> Notice however that SENTENCES, strictly speaking, are formal constructs of grammar and not empirical entities .... In performance speakers are dealing with UTTERANCES. However, there are no a priori or empirical reasons for maintaining that the formal linguistic unit underlying such utterances should necessarily be the sentence .... As a matter of fact we know that most utterances 'consist of' more than one uttered sentence, viz. a sequence of sentences. Such sequences are often referred to as 'discourse' or 'pieces of discourse'. (p. 3)

In this study we will preserve this distinction between sentences and utterances.

Propositions, like utterances, are expressed by sentences (Grimes 1971, Wilkins 1976, Clark and Clark 1977, Widdowson 1978 and 1979, Marshall and Glock 1978-79, van Dijk 1980). Similarly, there is no one-to-one correspondence between one proposition and one sentence. A sentence may contain more than one proposition, or conversely, a series of more than one sentence may form a proposition. In our analysis we distinguish, therefore, between the discourse level of meaning (propositional content and illocutionary force of each utterance) and the surface structure of a text (realized in sentences).

### 3) Alternative Versions of Text

In view of the notion that a text is an expression or a representation of propositions and illocutionary acts that are present at the level of deep structure, we may assume that different texts, representing alternative versions of a discourse, may be written. In other words, potentially, there are a number of texts that may be written to express the same ideas (Halliday 1971, Brown 1976, Lyons 1977, van Dijk and Kintsch 1977, Widdowson 1980, Schnotz 1983). That is, alternative texts can be written containing the same propositions. Illocutionary acts, however, may differ, depending on the placement of the propositions in the text.

Referring to Halliday's textual function of language, Widdowson (1980) explains that it is:

> the means whereby the language user organizes propositional content so that it is effectively conveyed ..... its business is to provide alternative versions of propositions so that they are appropriate to the state of shared knowledge ... at a particular point in an interaction. (p. 236)

In other words, there is no one-to-one correspondence between the ideas of the discourse, on the deep level, and their expression or realization in the sentence of the text, on the surface level. Moreover, some text versions may be more readable than others. (See below D.3.c.2) The Technique of 'Doctoring' Texts, p. 92-93.)

### 4) Text vs. Context

Thus we have a dichotomy between the discourse, or deep level meanings (i.e., concepts, notions, ideas) and their expression or realization as text on the surface level (Allen and Widdowson 1974). According to van Dijk (1980), the former has *contextual* relevance and the latter has *textual* relevance:

> An element of a text is textually relevant if it is relevant with respect to other elements of the text and contextually relevant if it is relevant to elements of the communicative context (e.g., the pragmatic context), the cognitive context, or the social context. (p. 249)

By this definition, contextual relevance includes non-linguistic as well as linguistic elements. This definition, however, is by no means accepted by all linguists (cf. Leech 1974, Halliday and Hasan 1976 [1]).

On the one hand, the use of alternative doctored text versions is based on the assumption that this distinction between the ideas in the text and the sentences through which these ideas are realized is valid.[2] On the other hand, when discussing a word in context, it is customary to refer to the words in the sentence which precede and/or follow the word in question. Thus, when applying linguistic theories to students' reading comprehension, one would be likely to deal primarily with the surface structure of the text. For this reason, in this study we will use the word "context" to include both the surface level structure and the deep level meaning.

One point that is agreed upon by linguists is that the meaning of a word, phrase, sentence, or discourse is affected by the context (Leech 1974, van Dijk and Kintsch 1977, Candlin et al. 1978, Widdowson 1979, Cicourel 1980). In vew of this fact, it makes sense to extend the analysis of discourse beyond the sentence level. In this way one can focus on the relations between sentences and paragraphs, and on the structure of the text as a whole. Here the term "sentence function" will apply to the sentence level, and "illocutionary force" will relate to the paragraph and whole-text levels.

## 5) Beyond the Sentence

Discourse analysis beyond the sentence level began with Harris (1952). Van Dijk (1972) also states that "sentence-based descriptions of the structures underlying utterances are inadequate" (p. 3). Meyer (1975) criticizes Chomsky for stopping at the sentence level:

> What is needed is an analysis procedure that classifies ideas in a passage not as subjects or verbs of individual sentences, but according to their role in conveying the total meaning of the passage. (p. 17)

This analysis procedure is discourse analysis. One of the focuses of discourse analysis is the "topic" or "theme" of a text.

### 6) Topic, Theme, Paragraph-Level Concepts

The well-known terms "topic" and "comment" are defined by van Dijk (1980):

> the notion of topic of a sentence is usually defined in terms of information that is already introduced ..., already supposed by the speaker to be known to the hearer or otherwise given or started from. The comment, then expresses or 'is' the information in the sentence that gives new, unknown, unpredictable, etc., information in relation to the topical information. (p. 94)
>
> Topic . . . is a semantic or a semantic-pragmatic notion. Second, a topic is not merely part of the semantic structure of a sentence but rather a function assigned to part of the semantic representation of a sentence. In other words, that part of the semantic representation that has a certain function is called the topic or has topic function. The same obtains for the notion of comment. (p. 95)

What some linguists call "topic" may also be called "theme" by others. It may be based on surface structure and sequence (i.e., the first part of the sentence), as discussed by Halliday (1967, 1974, 1977) and the Prague-School's linguists who emphasize functional sentence perspective (see Danes 1974, Palkova and Palek 1977). Or "theme" may be defined in terms of ideas and content; Crothers (1979) defines "theme" as a term meaning "the propositions most central to the text's development" (p. 8). Chafe (1972), Grimes (1975), and Crothers (1979) draw a distinction between "theme" and its surface manifestation, if any, the "topic." It appears, however, that what they call "theme" is what van Dijk terms "topic."

To avoid confusion, we will not use either the terms "topic" or "theme," because we are not interested in researching the topic- comment, theme-rheme, topic-theme distinctions. Instead, in this study we will use a global term, paragraph-level concepts, to refer to the major areas of propositional content, or macro-propositions, appearing in the text. Paragraph-level concepts will include both topic and comment, both theme and rheme.

### 7) Implication and Inference

Another level of meaning that extends beyond the sentence is implication. Whereas the writer "implies" ideas, the reader "infers" them. Hence, implication and inference may be seen as two aspects of the same process.

Crothers (1979) defines implication in the following way:

> Implication is the general term we will use here to include presuppositions, premises, and consequents .... The reason for seeking any one term at all is to contrast these three categories with purely referential inference of propositions. (p. 17)

Brown (1976) states:

> in combination with the explicit text, it forms the complete, intended content of the speech act. Thus, the "presupposed text" is the direct embodiment of the relevant "context" of a language act." (pp. 338-339)

Widdowson (1979) goes so far as to give more importance to the implicit than to the overtly stated proposition in the text:

> With certain kinds of sentence, the overtly expressed proposition carries with it an additional covert proposition as a necessary concomitant. This second, covert proposition is said to be presupposed. (p. 120) . . . it is these covert, presupposed, propositions which control whether or not a sequence of sentences makes cohesive discourse. (p. 123)

Other linguists (Jakobovits 1970, Brown 1976, van Dijk and Kintsch 1977) agree that meaning or propositional content is implied or encoded in text, and that this meaning may be expressed in a number of ways. It is also agreed that the context determining the interpretation of a particular word or sentence may extend beyond the level of the single sentence. In fact, sentence boundaries are not necessarily relevant to propositional content.

Finally, it is agreed that meanings may be expressed both overtly and covertly. This study will examine whether the implication(s) of a sentence change(s) if it appears in another part of the text (i.e., if the order of the sentences is changed so that the context of certain sentences is different). (See below C.2.b.1)b) Order of Information: Sequencing of Propositions (Given/New), pp. 62-68.)

## 2. Coherence

### a. Definitions

Coherence is not any easy term to define because there is disagreement as to its nature. Some linguists, in fact, attribute to it many of the characteristics of what we shall later refer to as Cohesion (See below B.3.a., pp. 39-40), and some linguists talk about Cohesion when they refer to what we will call Coherence. Nevertheless, there is some consensus among many linguists. In this study, we shall use the definition given by Langleben (1981):

> Coherence in its up-to-date sense is the capacity of a text to be consistent and interpretable. Any text that is perceived as meaningful is also presupposed to be a coherent one. The meaningfulness of a text is apparently dependent on its coherency [sic] to such an extent that the latter seems to be the most influential factor contributing to the comprehension of the text. (p. 280)

This definition is not quite complete, however. Brown (1976) includes the speaker and the hearer in his definition:

> the semantic linking which is the basis of discourse coherence and structure is referred back to its obvious source in meaning-choices made by speakers performing definite speech acts.... Hearers will recognize the discourse which results from such speech as unified by virtue of shared semantic content: propositional, modal and illocutionary content, respectively. Thus we define discourse coherence as a function of shared semantic content. (pp. 265-66)

Beaugrande (1980) continues the definition by including the means by which coherence is achieved:

> COHERENCE subsumes the procedures whereby elements of KNOWLEDGE are activated such that their CONCEPTUAL CONNECTIVITY is maintained and made recoverable. The means of coherence include: (1) logical relations such as causality and class inclusion; (2) knowledge of how events, actions, objects, and situations are organized; and (3) the striving for continuity in human experience. (p. 19)

Elsewhere Beaugrande (1980a) states that coherence rests on a recurrence of semantic components, e.g., "semantic components" or "propositions" (p. 290).

Van Dijk (1980) enumerates the conditions by which sentences or propositions are connected or cohere. These conditions include: cause/reason, result/consequence, explanation, introduction, relations such as general-particular and whole-part, knowledge of the world (i.e., the ability to infer meanings from the text). More specifically, van Dijk explains that in a coherent text, certain speech acts are homogeneous, or 'belong together'. (p. 181)

Less formally, Widdowson (1979) explains that coherence includes both illocutionary connections and propositions (what communication and how the communication is achieved) (pp. 146-147).

Van Dijk (1972) stresses that coherence accounts for the connectedness of discourse:

> The formal concept of text, then, must account for the important empirical notion of COHERENCE: a native speaker is able to produce and interpret an utterance

> 'as a whole', that is as a 'piece of CONNECTED discourse', and not merely as a linearly ordered set of discrete grammatical sentences. (p. 3)

The most concrete definition of coherence is given by Canale (1982): "the organization and unity of ideas in context" (p. 1). Coherence, according to Canale, consists of four conditions:

(1) development -- a sense of direction and order of presentation of ideas

(2) continuity — consistency of facts, opinion and writer perspective, as well as reference to previously mentioned ideas and the relevance of newly introduced ones

(3) balance -- relative emphasis accorded each idea (main or supporting)

(4) completeness -- the degree to which the ideas are sufficient to provide a thorough discourse (p. 6)

These four conditions work at both micro-levels (between sentences and within a paragraph) and macro-levels (across paragraphs).

In this study we will focus on condition (1) the sequencing of ideas. Experimenting with this condition, however, we will also touch on conditions (2) and (3). Condition (4) will not be considered here since it is not an experimental variable but a given condition, common to all the experimental texts.

Returning to our sample sentence (see above B.1.a.1) Utterances, pp. 21-22), we will put it into context:

> 1. The population threat must be faced . . . for what it inevitably is: a central determinant of man's future.
>
> 2. Last year the world's population passed 4 billion.
>
> 3. Unless there is a holocaust brought on by man or nature, the world's population will continue to increase.

This is an example of a text or a piece of connected discourse. It presents a problem, the threat of overpopulation, and implies a solution, man's awareness of this problem and his responsiblity for stopping its spread. The three sentences are linked by their common approach to the subject of population control. The type of text is argumentative expository prose.

These sentences are part of a larger text. If the position of these sentences is changed so that they do not appear consecutively but intermingled with other sentences in the text, it is reasonable to expect that both the balance of ideas and the continuity of facts and writer's perspective will be affected. Whether this change also affects difficulty of reading comprehension will be one of the factors investigated in this study.

### b. Micro-level and Macro-level Analyses

Linguists speak of two levels of coherence: local or micro-level and global or macro-level.[3] Van Dijk (1981) explains the difference clearly:

> We distinguish between two kinds of coherence, viz. local and global coherence. Local coherence is defined for (pairwise) relations between sentences of a textual sequence. Global coherence is defined in terms of (operations on) whole sets of sentences, e.g. for the discourse as a whole. Global coherence is also known, in more intuitive terms, as the 'theme', 'upshot', or 'gist' of a discourse or a passage of the discourse. It is made explicit in terms of semantic macrostructures. These are derived from sequences of text by so-called macro-rules, which delete or select information (propositions), generalize, or construct more embracing propositions. (p. 268)

Baten (1981) explains the distinction in grammatical and lexical terms:

> An analysis of 'micro-level' involves an analysis of the word, clause, or sentence level, i.e., the micro-elements. A 'macro-level' analysis focuses not only on macro-structures, i.e., a paragraph or a text, but also on various features from the perspective of the whole discourse (e.g., lexical chains in a text). (p. 20)

Kintsch (1977) explains the usefulness of macro-analysis:

> It is insufficient to represent the meaning of a text proposition-by-proposition; these propositions must be organized into some overall structures, which is the macro-structure of the text. It is necessary to assume the existence of this processing stage, because without it we have no means of dealing with such important concepts as the gist of a text, or its summary. (p. 35)

Van Dijk (1980) also includes summaries and paraphrases as macro- structures. (p. 100)

At this point it is possible to redefine texts and coherence in terms of macro-structures. Using the terms micro- and macro-structure, Baten (1981) gives this definition of coherence:

> According to Van Dijk (1977 c), text coherence means that a) the denoted facts in a text are related (linear coherence), and b) these relations must be relative to a topic of discourse (global coherence). Furthermore, the coherence of this over-all organization of the text can be represented by a set of macro-propositions. Macro-propositions are, in short, assignments of global meanings and references of the text under examination. (p. 118)

In our sample utterance (see above B.2.b., Definitions, pp. 33- 36), the micro-level analysis would deal with the sentence sequence of:

1. writer's warning (and implied solution),
2. fact supporting writer's argument,
3. one unacceptable solution (implying that there are other, better ways to solve the problem)

On the macro-level, the topic would be the problem of population control.

The theories on the functioning of macro-structures have direct bearing on the effect of changing the order or sequencing of sentences in a text to obtain a fairly readable text version. We are not speaking of scrambling a text beyond recognition, but of changing the order to obtain an alternative, acceptable version of the text. (See below C.2.b.1)a)2), Concentration of Information: Chunking / Macrostructures / Superordinates, pp. 60-62.)

## 3. Cohesion

### a. Definitions

In this study, the definition of Cohesion is essentially the one given by Halliday and Hasan (1976):

> Cohesion refers to the range of possiblities that exist for linking something with what has gone before. Since this linking is achieved through relations in MEANING . . . , what is in question is the set of meaning relations which function in this way: the semantic resources which are drawn on for the purpose of creating text . . . . we have to show how sentences, which are structurally independent of one another, may be linked together through particular features of their interpretation; and it is for this that the concept of cohesion is required. (p. 10)

According to Halliday and Hasan, there are two elements involved in cohesion: the presupposed element ("referent") and the presupposing element ("reference item" or "the item") (p. 4). Cohesive relations are not limited to sentence boundaries (pp. 7-9)). For example, we may change our sample utterance 3 (see above B.2.a., Definitions, p. 36) from:

> Unless there is a holocaust . . . the world's population will continue to increase.

to:

> Unless there is a holocaust . . . it will continue to increase.

The presupposed element the world's population is referred to by the presupposing element it.

Cohesion is overtly signalled by such markers as *it*, *so*, and *yet* (Halliday and Hasan 1976). In Grimes' words (1978), cohesion

> has to do with the means of introducing new information and of keeping track of old information, rather than with what the content of the new or old information actually is. (p. 113).

In other words, cohesion occupies itself with the signalling more than with the message.

Beaugrande (1980) stresses the element of surface structure:

> COHESION subsumes the procedures whereby SURFACE elements appear as progressive occurrences such that their SEQUENTIAL CONNECTIVITY is maintained and made recoverable. (p. 19)

### b. Cohesion vs. Coherence

In the theoretical literature, the terms coherence and cohesion overlap. Part of what Kintsch and van Dijk (1978) and van Dijk (1980) call "coherence" (i.e., the "reference" component of semantics) is in fact what Halliday and Hasan (1976) term "cohesion" (van Dijk 1977 c, Note 1, p. 126). To confuse matters even more, Crothers (1979) states that coherence and cohesion are identical (p. 1). Gutwinski (1976), on the other hand, has decided to avoid the term "coherence" altogether even though he is discussing the same phenomenon, and uses only the term "cohesion."

In an attempt to clarify matters, we wish to point out some areas where cohesion and coherence, as defined in this study, are different.

> 1. Cohesion is the overt relationship between propositions expressed through sentences. Where we recognize that there is a relationship between the illocutionary acts which propositions, not always overtly linked, are being used to perform, then we are perceiving the coherence of the discourse. (Widdowson 1978, pp. 28-29)
>
> (See also Levy 1979, p. 184; Widdowson 1979, p. 145; Langleben 1981, p. 280, pp. 285-288)
>
> 2. One can trace propositional development through cohesion and illocutionary development through coherence. (Widdowson 1978, p. 30)
>
> 3. Language can be cohesive (i.e., contain linking words) without being coherent (i.e., making sense). (Widdowson 1978, p. 45)
>
> Note: The converse is also true: language can be coherent without being cohesive (i.e., containing no overt markers of cohesion).
>
> 4. Cohesion is one aspect of coherence (van Dijk 1977 c, Note 1, p. 126; Baten 1981, pp. 66-67; Langleben 1981, p. 280)

Thus Beaugrande (1980) says:

> cohesive devices . . . do not make the text coherent; the prior assumption that the text is coherent makes these devices useful. (p. 134)

This distinction between cohesion and coherence is well explained by Carrell (1982):

> Cohesion is not the cause of coherence; if anything, it's the effect of coherence. A coherent text will likely be cohesive, not of necessity, but as a result of that coherence. Bonding an incoherent text together won't make it coherent, only cohesive. (p. 486)

> recognizing that a text is about an example of a class of situation makes possible the complete processing of the cohesive elements in that text. If a reader does not have, or fails to access, the appropriate background schema underlying the text, all the cohesive ties in the world won't help tha text cohere for that reader. (p. 485)

Widdowson (1979) distinguishes between cohesion procedures, where the propositional development can be traced by looking at anaphora, thematization, and grammatical cohesion, on the one hand, and coherence, where the language user is aware of illocutionary connections in the expression of particular propositions, on the other hand. Tierney and Mosenthal (1981) have shown cohesion and coherence to be unrelated factors in a text.

### c. Means of Cohesion

According to Halliday and Hasan (1976),

> cohesion is expressed partly through the grammar and partly through the vocabulary. (p. 5)

Halliday and Hasan refer to two types of cohesion: grammatical and lexical, although they admit that

> there is no hard-and-fast division between vocabulary and grammar. (p. 5)

They subdivide grammatical cohesion into the categories of reference (e.g., anaphora), substitution, ellipsis, and conjunction, and they subdivide lexical cohesion into the categories of general items, superordinate relationships, repetition, synonymy, and collocation.

Although other definitions and categorizations of cohesion exist (Quirk et al. 1972, Lyons 1977, Beaugrande 1980, van Dijk 1980), this study will work with the one given by Halliday and Hasan (1976).

### d. Grammatical Cohesion -- Anaphora

#### 1) Reference

##### a) Exophoric Reference

Exophoric reference is situational (Halliday and Hasan 1976, p. 33). It takes us outside the text altogether and is therefore not cohesive (Halliday and Hasan 1976, p. 18). For the purposes of this study, however, I have decided to include examples of exophora together with other examples of grammatical cohesion.

### b) Endophoric Reference

Endophoric reference, being based on the text itself, is cohesive. There are two kinds of endophoric reference: anaphora and cataphora. Anaphora is the form of reference or presupposition that points back to some previous items in the text (Halliday and Hasan 1976, p. 14; Grimes 1978, p. 125). Cataphora is the form of reference which points forward to an item not yet stated (Halliday and Hasan 1976, p. 17; Grimes 1978, p. 126).

The grammatical cohesive items discussed in this study have been categorized differently by different linguists. Halliday and Hasan (1976) discuss three types of reference: personal (e.g., he, her, it, their), demonstrative (e.g., this, these, that, those), and comparative (e.g., identical, same, such, other, else). (This study limits itself to an investigation of the effects of only the first two, personal and demonstrative reference because they appear frequently in texts. Comparative references being much rarer, it would be difficult to draw meaningful conclusions without sufficient data in this limited study.)

In addition to the above items, a text often contains groups of cohesive chains (Halliday and Hasan 1976, p. 15) (e.g.: Humor . . . a sense of the comic . . . it . . . it . . . ). Baten (1981, p. 68) calls this phenomenon "cohesive harmony." This study will also examine the effect of cohesive chains on reading comprehension.

### 2) Substitution

Substitution is a device for abbreviating and avoiding repetition (Quirk et al. 1972). Halliday and Hasan (1976) speak of nominal substitution (e.g., one/ones, the same, so), verbal substitution (e.g., do, be, have), and clausal substitution (e.g., so, not). The categorization of substitutes refers to the three forms of noun, verb, and clause substitution.

Let us examine some sentences from Text 2 (See Appendix B).

example (1): Original Version

> An increase in the education of women tends to lower fertility to a greater extent than a similar increase in the education of men.

example (2): Doctored Version

> An increase in the education of women tends to lower fertility to a greater extent that it does in the education of men.

In the second example the word it substitutes for the noun phrase an increase in the education, and the word does substitutes for the verb phrase tends to lower fertility. One question asked in this study is whether either of these two versions is easier for EFL learners to read.

### 3) Ellipsis

Like substitution, ellipsis is "an abbreviating device that reduces redundancy" (Quirk et al., 1972, p. 537). They describe ellipsis in the following way:

> Ellipsis is a purely surface phenomenon . . . . Words are ellipted only if they are uniquely recoverable, i.e. there is no doubt as to what words are to be supplied, and it is possible to add the recovered words to the sentence. (p. 536)
>
> A major use of ellipsis is the avoidance of repetition, and in this respect it is like substitution, which can often be used instead of ellipsis. (p. 537)

Halliday and Hasan (1976) explain ellipsis by contrasting it with substitution:

> An elliptical item is one which, as it were, leaves specific structural slots to be filled from elsewhere. This is exactly the same as presupposition by substitution, except in substitution an explicit 'counter' is used, eg: one or do, as a place-marker for what is presupposed, whereas in ellipsis nothing is inserted into the slot. That is why we say that ellipsis can be regarded as substitution by zero. (p. 143)

An example of ellipsis appears in Text 3:

> How much money a person needs . . . will vary . . . .
> In general, more is needed with each passing year.

Here, the word more is understood as meaning: more money. The word money, however, is omitted. This omission is called "ellipsis."

Halliday and Hasan (1976) divide ellipsis, like substitution, into nominal, verbal, and clausal categories. However, so few examples of each category were found by the researcher in the experimental texts used in this study, that all these are condensed into a single category called ellipsis.

### e. Lexical Cohesion -- Reiteration

Halliday and Hasan (1976) distinguish between grammatical and lexical cohesion in the following way:

> Reference, substitution and ellipsis are clearly grammatical, in that they involve closed systems: simple options of presence or absence, and systems such as those of person, number, proximity and degree of comparison. Lexical cohesion is, as the name implies, lexical; it involves a kind of choice that is open-ended, the selection of a lexical item that is in some way related to one occurring previously. (p. 303)

Halliday and Hasan (1976) define reiteration in the following manner:

> Reiteration is a form of lexical cohesion which involves the repetition of a lexical item at one end of the scale; and a number of things in between -- the use of a synonym, near-synonym, or superordinate . . . one lexical item refers back to another, to which it is related by having a common referent. (p. 278)

Four subcategories of reiteration are discussed:

1. the same word
2. a synonym or near-synonym
3. a superordinate
4. a general word

These subcategories are exemplified in the following sentences:

> 1. He found what he thought might be an interesting pamphlet on the shelves. Upon inspection, however, the pamphlet turned out to contain irrelevant material.

2. He found . . . pamphlet . . . the booklet . . . .

3. He found . . . pamphlet . . . the publication . . .

4. He found . . . pamphlet . . . the material turned out to be irrelevant.

In these examples the word pamphlet is first repeated, then replaced by a synonym, a superordinate, and finally by a general word.

The distinctions between categories are not always clear and obvious, however. The general noun is considered part of lexical cohesion. Nevertheless, it is not very different from the pronoun (see above B.3.d., Grammatical Cohesion, pp. 43-46).

Halliday and Hasan (1976) explain the class of general noun in the following way:

> On the borderline between grammatical and lexical cohesion is the cohesive function of the class of GENERAL NOUN. We can speak about a borderline here because a general noun is itself a borderline case between a lexical item (member of an open set) and a grammatical item (member of a closed system) . . . examples: people, person, man, woman, child, creature, thing, object, stuff, business, affair, matter, move, place, question, idea. (p. 276)

This listing is similar to the reiteration category called lexical cohesion by other linguists (Leech 1974, p. 100; Gutwinski 1976; Lyons 1977).

### f. Boundaries between Grammatical and Lexical Cohesion

After having identified, defined, and categorized grammatical and lexical cohesion, I would like to add a word of caution. The distinctions may be theoretically clear, but they tend to become blurred when one applies them to actual texts. As some linguists have explained (Cruse 1975, Halliday and Hasan 1976), boundaries are not always hard-and-fast, and therefore categorizations are not precise in the absolute sense. There may be some disagreement among linguists when categorizing markers of coherence and cohesion.

### 4. Reading and the Extra-Textual World -- Pragmatics

Reading a text involves more than lexico-grammatical, linguistic meaning. It also entails knowledge of what has been called the social-cultural meaning (Fries 1954), the social system (Halliday 1978, p. 79), the social context or semiotic structure (Halliday 1978, pp. 110, 122), the physical and social situation of speaker and hearer (Winograd 1977, p. 75), situationality (Beaugrande 1980, p. 20), the real world (Candlin et al. 1978, p. 196) -- in other words, what is generally known as the pragmatic meaning of a text.

Pragmatics includes the pragmatic meaning and speech act / illocutionary force of an utterance (Widdowson 1979, p. 128; van Dijk 1980, p. 175, and 1981, p. 221) -- which together express the writer's intention (Bever and Townsend 1979, p. 169).

List of Features Included in

## 5. Model of Discourse

At this point in the study, we propose a model for the description of discourse (i.e., reading) with the aid of which we can explain how writers express their ideas and readers discern meaning in the text.

LIST OF FEATURES INCLUDED IN

### MODEL OF DISCOURSE

a. Non-Linguistic Elements: situational-semantic components -- propositional content
  1) reader's contextual frame(s)
    a) subject matter
    b) paragraph-level concepts: real-world information (Obvious/Implied)
  2) writer's intention

b. Linguistic System: functional-semantic components -- propositional development
  1) Coherence (little or no overt signalling)
    a) concentration of information: micro-propositions, macro-propositions
    b) order of information: sequencing of propositions (Given/New)
    c) interpreting information: speech acts/ illocutionary acts/ sentence functions/ rhetorical functions
  2) Cohesion (overt signalling)
    a) grammatical
    b) lexical

This model is based on the work of Halliday and Hasan (1976), van Dijk (1976), and Widdowson (1978). The model proposed here is not meant as an integrated combination of the theories of all three linguists. Rather, it is a working plan in which those features believed to be especially relevant to the purposes of this research were selected and modified.

Having presented a model of discourse, we now wish to explain how it applies to the reading process. First, we will show how the reading process is defined and described in the literature. Then we will explain the connection between the model of discourse, the reading process, and reading difficulty for both native readers and students of English as a Foreign Language (EFL).

## C. THE READING COMPREHENSION PROCESS

### 1. Reading Defined

In general terms, there is agreement in the literature about how reading is defined. According to Goodman (1972), "Reading is the reconstruction of meaning" (p. 46). Other researchers agree with this basic definition (Robinson 1960, Freedle and Carroll 1972, Marshall and Glock 1978-79, Gorman 1979, Neufeld and Webb 1981). Carroll (1972) comments more specifically on the problems involved in this definition:

> The commonly accepted definition of comprehension is that it is the process of apprehending the "meaning" of something -- the "meaning" of a word, of a phrase or idiom, of a sentence, or of a longer discourse. This implies that in order to assess the comprehension of a given segment of a verbal message, we must identify the "meaning" that is to be comprehended. The identification of meaning is a difficult and tangled problem. (p. 10)

Smith (1976) gives a differently phrased definition, focusing on the reader:

> Information is the reduction of uncertainty by the elimination of alternatives. (p. 16)

This definition suggests why the extraction of meaning is so complicated. Thorndike (1917) likens it to solving a problem in mathematics:

> Understanding a paragraph is like solving a problem in mathematics. It consists in selecting the right elements of the situation and putting them together in the right relations, and also with the right amount of weight or influence or force for each. The mind is

> assailed as it were by every word in the paragraph. It must select, repress, soften, emphasize, correlate and organize, all under the influence of the right mental set or purpose or demand. (p. 329)

In this sense reading may be defined as "a disambiguating process" (Schlesinger 1977) or "the way in which ambiguity is resolved in an attempt to derive meaning" (Neufeld and Webb 1981, p. 2).

Focusing on the reader, Smith (1976) defines comprehension as "the interpretation of experience; relating new information to what is already known" (p. 240). This definition introduces another factor into the reading process: the notions of given and new are added to the decision-making process of the reader.

Shifting the responsibility of the reading process further in the direction of the reader, Sanford and Garrod (1981) state:

> The ultimate goal in understanding a piece of discourse is to relate it to some hypothetical or real state of the world -- in other words, to determine to what it is that discourse refers . . . . Finally, reading depends upon the attitude and competence of the reader. (pp. 187-188)

As Carrell (1982) explains, the relation between text and reader is the basis for schema theory:

> Schema theory maintains that processing a text is an interactive process between the text and the prior background knowledge or memory schemata of the listener or reader. (p. 482)

The concept of "schema" is concisely described by Cicourel (1980):

> A schema refers to a data structure by which generic concepts stored in memory can be represented. (p. 118)

Thus the definitions of reading range from emphsasis of the text, on the one hand, to emphasis of the reader, on the other. In this study, both aspects will be examined.

## 2. Factors Involved in the Reading Process

There are basically two sets of factors involved in the reading process: on the one hand, it involves the set of non-linguistic elements centered in the reader and the writer, and on the other hand, it involves the set of linguistic elements in a text. This dichotomy has been recognized by many researchers (Klare 1963 and 1976; Nile 1963; Schlesinger 1968, 1977; Gilliland 1970; Freedle and Carroll 1972; Macworth 1972; Olson 1972; Strang 1972; Thorndyke 1976, 1979; Perfetti and Lesgold 1977; Fishman 1978; Widdowson 1978, 1979, and 1980; Marschark 1979; Iser 1980; van Dijk 1980; Neufeld and Webb 1981; and Sanford and Garrod 1981).

### a. The Non-Linguistic System: Situational-Semantic Components -- Propositional Content

#### 1) Reading Comprehension for EFL Learners vs. Native Speakers of English

In adapting a reading comprehension model, we are making the following assumptions:

1. that the model works in the same way for EFL learners as for native speakers of English

2. that the problems of advanced EFL learners are similar to those of less skilled, poor, or not-so-fluent, native readers.

These assumptions are in keeping with findings in the literature. Baten (1981) found that the mother tongue reading model was applicable in the foreign language (p. 153).

The problems reported by researchers working with foreign language learners (Kaplan 1966, Gorman 1979, Hatch 1979, Sim 1979, Baten 1981, and Neufeld and Webb 1981) were similar to those reported by researchers working with native speakers (Niles 1963, Wright 1972, Meyer 1875, Meyer et al. 1980, Perfetti and Lesgold 1977, Levelt 1978, Marshall and Glock 1978- 79, Irwin and Davis 1980).

### 2) The Reader's Contextual Frame(s)

#### a) Subject Matter

> learning to read is not a matter of a child relying upon instruction, because the essential skills of reading -- namely the efficient uses of nonvisual information -- cannot be taught. (Smith 1976, p. 179)

What Smith (1976) refers to as "nonvisual information" includes subject matter and knowledge of the real world. Many researchers believe that knowing the subject matter aids reading comprehension (Strang 1972, Klare 1976, Kintsch and Vipond 1977, Kieras 1978, Marshall and Glock 1978-79, Levy 1979, Baten 1981, and Neufeld and Webb 1981). Grellet (1981) says, "what one brings to the text is often more important than what one finds in it" (p. 7).

#### b) Real-World Concepts (Obvious/Implied)

Not only knowledge of the subject matter in the text, but also a more general pragmatic knowledge of the world is involved in reading (Weaver 1964, Schlesinger 1966, Carroll 1972, Clymer 1972, Strang 1972, Halliday and Hasan 1976, Thorndyke 1976, Winograd 1977, Gorman 1979, Hatch 1979, Widdowson 1980, Tierney and Mosenthal 1980, Baten 1981, Neufeld and Webb 1981).

According to Beaugrande (1980), one could only understand a concept found in a text if one had encountered it previously in the real world:

> It seems to me that referring is in fact accomplished via the entire TEXT-WORLD MODEL . . . . If people do match the content of texts with their notion of the real world, then the completed text-world model should give the clearest indication of what to look for. (p. 66)

Smith (1978) refers to this prior knowledge as redundancy, arguing that the reader could not perceive the redundancy in a written text unless it reflected knowledge already present in the reader's mind (p. 19).

This knowledge of the world extends to the reader's expectations concerning what is found in a given text. The reader is required to make inferences about information in the text, whether this information is explicitly stated or implied in the context (Schlesinger 1966, Olson 1972, Thorndyke 1976, van Dijk 1980). The more explicit the text, the easier it is to read (Schlesinger 1966, p. 189; Baten 1981, p. 119).

### 3) Writer's Intention

The reader's task includes not only the deciphering of information, but also understanding the writer's intentions. There must be communication between the writer and the reader. For the purposes of this study, the writer's intention includes more than the construction of a coherent and cohesive text. It also includes the reader's recognition of the writer's meaning, purpose, tone, and mood/attitude (Clymer 1972, Davis 1972, Spearritt 1972, Strang 1972).

The difficulty for the reader is that the writer's intention does not necessarily appear as explicit information in the text. According to Marshall and Glock (1978-79):

> The truly fluent reader is one who can infer the complete text base of a discourse from incomplete information in the surface structure. This reader communicates with the author through the discourse very efficiently.
>
> The not-so-fluent reader is one who cannot infer the existence of structures in the text base unless these structures are explicitly referenced in the surface structure of the discourse. This reader does not communicate efficiently with the author. He comprehends what the author says rather than what the author means. (pp. 51-52)

For students of EFL, this difficulty is compounded. On the one hand, their language proficiency may not be adequate, so that they may not notice clues such as cohesive markers (Sim 1979) and sentence structure (Pierce 1973, Baten 1981). On the other hand, they may not be sensitive enough to semantic, stylistic, and cultural nuances (Baten 1981). For both these reasons students of EFL find it more difficult to follow the writer's intention.

### b. The Linguistic System: Functional-Semantic Components -- Propositional Development

When reading a text, readers contribute their prior knowledge, experience, and expectations. What they find in the text itself is the development of the writer's ideas, or propositional content. There are various explanations in the literature as to how these ideas in the text are processed.

### 1) Coherence (little or no overt signalling)

### a) Concentration of Information: Micro-propositions, Macro-propositions

### 1) Number of Propositions and Reading Time and Difficulty

According to Kintsch et al. (1975),

> reading time increases monotonically with the number of propositions in a text base, even if the length of the corresponding text is controlled. (p. 206)

They also believe it to be common sense that a text which repeats the same ideas is easier than a text which discusses many different ones (p. 197).

Moreover, according to Kintsch and Vipond (1977), the number of propositions also affects reading difficulty:

> texts may be comparable in word length, but they may differ in the number of propositions expressed by these words. (p. 343)

Fishman (1978) and Baten (1981) have found that it is not the length of the text (i.e., the number of words), but the number of propositions that affects the reading process.

### 2) Concentration of Information: Chunking / Macrostructures / Superordinates

According to Smith (1978), chunking is "the organization of information into the most compact (most meaningful) unit" (p. 208). The chunking model is generally accepted in the literature (Miller 1956, Weaver 1965, Chafe 1972, Kintsch 1977, Marschark 1979, Sim 1979, Baten 1981).

Other researchers call the same phenomenon by different names. Van Dijk (1977 b) speaks in terms of the reader's use of macrostructures:

> If a discourse is at all long, subjects are unable to process it at a micro-level alone: not only are they unable to store and retrieve such discourse verbatim, but they are also unable to retrieve the constituent propositions. At the same time, if the sequences of sentences can be assigned a macro-structure, they will be recalled much better than scrambled sequences. Thus, comprehension . . . probably takes place at several levels, such that lower-level information is organized, reduced, and represented at higher levels. These processes involve the use of macro-rules; the input to the macro-rules is the micro-structure, and the output is the macro-structure. (p. 4)

Elsewhere, van Dijk (1980, pp. 14-15) gives three functions which macrostructures serve during reading comprehension: to organize complex (micro-)information so that units may be distinguished and can be used to form larger units, to reduce complex information so that less important micro-information may be disregarded, and to construct (or represent) new meaning on a global level from information derived from many local meanings so that additional ways of comprehension of complex information are created. According to Kintsch and van Dijk (1978), both fluent and not-so-fluent readers comprehend at the micro- and macro-levels.

It must be borne in mind, however, that the concepts of micro- structure and macro-structure need a context of more than one or two short paragraphs. For short, 150-word texts, Kintsch and Vipond (1977) do not distinguish between micro-structure and macro-structure. Since we wish to research students' reading on both micro- and macro-levels, the texts used in this study are fairly long and contain several paragraphs.

Using the terms superordinates and subordinates instead of macro- and micro-structures, Crothers (1972), Kintsch et al. (1975), Meyer (1975), Kintsch and Vipond (1977), and Vipond (1980) all found the same results: superordinates are recalled more often than subordinates. Superordinates are defined as more general, abstract levels of the text, whereas subordinates are details and examples.

Kieras (1978) suggests a reason for this discrepancy between recall of the general and of the specific. In this view, the reader has sufficient expectations about global, high-level text organization so that he understands the text. On the lower level of paragraphs and sentences, however, the reader does not have prior knowledge.

> In all these cases where content stereotypicality is lacking, the reader must rely on essentially syntactic information, or textual surface structure (van Dijk 1972), to specify how the text content should be integrated. (p. 14)

For this reason, the micro-propositions may be less easily recalled, and may also be more difficult to comprehend.

Kieras (1978) extends this theory to apply to writing style:

> The bad paragraph orders have many new sentences and thus entail maintaining several separate chunks for a time. In contrast, the good orders establish a single chunk at the outset and just add each subsequent proposition to this single chunk. (p. 25)

By a chunk, Kieras is referring to a chunk of information which is comprised of an integrated set of propositions. Kieras found that top-down (main idea topmost) passages produce higher recall than bottom-up (least important ideas first) passages. That is, the paragraph will be easier to read if the first sentence is an important one. (p. 19)

For foreign language learners, the problem of decoding on the sentence level is compounded by their difficulty with the language itself as well as with the ideas in the text. In fact, this language problem may prevent them from using the information in the text to derive macro-structures (Widdowson 1980, p. 242).

### b) Order of Information: Sequencing of Propositions (Given/New)

One of the questions asked in this study is whether the sequence or order in which propositions appear in a text affects reading comprehension; that is, whether changing the coherence of a text will change its understandability. There seem to be two arguments, one in favor of and the other against the idea that changes in sentence sequencing affect reading comprehension.

On one hand, many linguists assume that a change in context will result in a change of meaning of a word or sentence. Widdowson (1978) argues that different versions of text function differently:

> to alter the arrangement is to alter the illocutionary character of the discourse. Although they can all be said to be 'saying the same thing', they are not all doing the same thing. Are they, then, all equally coherent? That is to say, is the illocutionary development equally acceptable in each case? (p. 44)

He answers the question in the negative (p. 45), explaining that deviations or differences from the normal patterns of coherence strain the reader, and that therefore the more usual the text version, the more acceptable it is.

Van Dijk (1980) also argues that a change in context will affect text readability:

> Since each speech act, by definition, changes the (pragmatic) context, it is also able to influence the initial successfulness conditions of further (speech) acts. If we have informed somebody about something by asserting that p, the context may have changed such that the hearer after the assertion knows that p; this new context would make new assertions of p by the same speaker in the same situation theoretically inappropriate. (p. 181)

Niles (1963), Bever (1972), Danes (1974), Meyer (1975), Halliday and Hasan (1976), Gutwinski (1976), Fishman (1978), Kieras (1978), Marshall and Glock (1978-79), Gorman (1979), Meyer et al. (1980), and Tanenhaus and Seidenberg (1981) would all agree that surface order can influence comprehension of concepts in a text. Widdowson's statement (1978) is appropriate here: "The re-arrangement of propositional content, then, has illocutionary implications." (p. 41)

On the other hand, other researchers (Clymer 1972, Davis 1972, Strang 1972, and Thorndyke 1976, 1979) have shown that readers or hearers naturally try to impose some meaningful interpretation on a series of given propositions. Gutwinski (1976) explains:

> The order in which sentences follow one another in a text is an important feature in the recognition of a group of sentences as a text. This can be testified to by the fact that speakers of a language, when presented with any assembly of sentences following one another -- even when those sentences have been chosen from various distant parts of a text and put together randomly, will try hard as they can to impose some interpretation on the whole. Simply by virtue of their appearing in a certain order together, the assumption is made that the collection of sentences is a text. (p. 54)

Thus, according to this viewpoint, it does not matter in what order the ideas or information in the sentences appear; readers will try to fabricate a text from them according to some already existing pattern in their mind.

Strang (1972) explains that the reader, "reading beyond the lines,"

> may arrange the author's ideas into new patterns, extending their scope or fusng them with ideas that he himself has gained from reading or from experience. (p. 75)

Experiments with memory have shown that readers do not recall specific words or sentences and retain only the meaning or "gist" of the text (Weaver 1962, Sachs 1974, Hirsch 1977, Marshall and Glock 1978-79, Forster 1979, Marschark 1979, Sanford and Garrod 1981). Also working with memory, Kintsch (1977) assumes that each reader has stored in his mind a fixed story schema which he fills in, in the order that the information is given, while reading:

> Scrambling the order of paragraphs in a well- structured story affects comprehension remarkably little . . . The reason for this, I suggest, is that comprehending such a story involves filling in waiting slots in a fixed story schema according to certain well known rules and strategies. Even if the paragraph order is scrambled the reader can, with a little extra effort, find the correct place for each paragraph in that schema. (p. 50)

Thorndyke (1979), researching newspaper stories, draws the same conclusions. Although the studies by Kintsch (1977) and Thorndyke (1979) pertain to narrative texts whereas this study deals with expository, argumentative texts, we believe that the same principles hold true for both types of texts, at least to some extent.

These two arguments are presented in an article by Kintsch and van Dijk (1978), who do not see them as conflicting. First, they argue that the reader provides the missing links in a discourse even if the propositions are not directly connected (p. 365). Then they explain that each sentence must be interpreted according to the context of the surrounding sentences (p. 390). It is possible, then, that sentence order or idea sequence affect reading comprehension when readers do not provide their own links but use only the links found explicitly in the text. This kind of reading would probably be found with the not-so-fluent readers (Marshall and Glock 1978-79).

Sentence comprehension is also seen by Auble and Franks (1983) as an interaction between two processes. Proposing the "computation model" of comprehension, they discuss the interaction between top-down processing from activated schema and bottom-up processing from concepts in the sentence:

> Sentence processing is seen as a combination of bottom-up processing from the sentential information with top-down processing from activated schemata. ... Comprehension occurs when preexisting knowledge structures have been modified and combined in such a way that optimal fit with the novel information expressed in the sentence is achieved. (p. 396)

Thus top-down and bottom-up processing seem to occur simultaneously (see also Adams 1980 and Rumelhart 1980). Presumably, the top-down component would not be affected by sequencing of information, but the bottom-up component would be affected.

Another argument against the notion that changes in sentence order affect readability pertains to the transformation from micro-structures to macro-structures. Van Dijk (1980) gives a list of transformations and then explains:

> These transformations in principle allow that the resulting reproduction of a text is different from the information in the text. (p. 262)

If there is indeed no one-to-one correspondence between the meanings in a text and the surface structure by which the are realized (see above B.1.b.2), Meanings and Their Surface Manifestations, pp. 26), then these transformations are made by readers automatically as they read. That is, readers simultaneously read a text and concentrate the many micro-propositions into a relatively small number of macro-propositions simultaneously while reading. If it is true that readers reorganize the ideas in the text during the reading process, no matter how the propositions (or the sentences containing them) are presented, then it may not really matter in which order they receive the information to begin with. On the other hand, the number of reorganizations necessary to process the information may also directly contribute to reading difficulty (Baten 1981, p. 17)

Beaugrande (1980) offers another solution:

> Miscues due to COHERENCE occur when spreading activation of already processed concepts provides material interpolated at other points . . . . suggest that surface sequencing has an important influence on text processing, even though quantitative recall was not severly affected. (p. 227)

That is, the difficulty may not appear quantitatively; nevertheless it exists. Baten (1981) found that changed order might make the text more difficult to process without affecting performance on comprehension questions. The problem of the effect of changed sentence order on reading comprehension will be researched further in this study.

Still another possible explanation was offered by Marshall and Glock (1978-79). Testing two groups of truly fluent and not-so-fluent readers at two American colleges, Marshall and Glock found that the not-so- fluent group relied upon the surface structure to provide all cues as to meaning, whereas the truly fluent group were capable of ignoring surface structures and could infer the complete message even when it was not explicitly stated in the text. (p. 47) The implication of this study would be that changes in order of information would affect students of lower English proficiency rather than students of higher English proficiency.

Another sequencing factor affecting reading comprehension is whether a text contains information familiar to the reader ("Given") or presents new information ("New"). Readers try to relate ideas in each sentence to ideas they already know (Strang 1972, Thorndyke 1976, Kieras 1978, Beaugrande 1980, Vipond 1980, Sanford and Garrod 1981). If the information is not readily familiar (i.e., not part of the short term memory), a search is made in the long term memory. This process adds to the reading processing time (Kintsch and Vipond 1977).

Although the Given/New dichotomy may be a factor in comprehension, it is difficult to determine for any reader which specific information is Given and which is New (Bever and Townsend 1979). For this reason, this dichotomy will not be directly researched in this study except as a possible factor affecting the ease or difficulty of comprehension resulting from changes in sequencing.

### c) Interpreting Information: Speech Acts/ Illocutionary Acts/ Sentence Functions

Focusng on the relations between sentences, we deal with speech acts (illocutionary acts) and sentence functions. Researchers who have pointed out the role of sentence (rhetorical) function in reading comprehension are Niles (1969), Clymer (1972), Allen and Widdowson (1974), Carpenter and

Just (1977), Fishman (1978), Gorman (1979), and Beaugrande (1980). Van Dijk (1980) goes as far as to claim:

> We may predict part of the meaning/reference of a sentence just by knowledge of the assumed or expected speech act performed and of the actual social context. (p. 206)

Familiarity with rhetorical functions is especially important for the EFL learner. Kaplan (1966) demonstrates paragraph developments different from those normally appearing in English. As a result, he advocates the teaching of contrastive rhetoric in the same sense that contrastive grammar is presently taught (p. 14).

Following this line of reasoning, we decided to examine sentence (rhetorical) functions as indicators of reading difficulty. Finding a useful categorization of sentences and paragraphs by which to analyze texts, however, was not an easy task; a variety of categorizations exists in the literature.

Speech act theory, as formulated by Austin (1962), presents a list of illocutionary acts, of which we found the expositives (e.g., illustrate, clarify, refer, argue, insist, define) most pertinent to our study. These speech acts may be direct (i.e., explicitly stated) or indirect. More recently, Cicourel (1980) lists six categories of performative verbs: statements (e.g., quote, claim), directives, questions, reactions (e.g., agreeing, disagreeing), expressives (e.g., approving, disapproving), and commissives (e.g., promise, vow) (p. 105). He also includes "contrasts" among speech acts (p. 108). Since acts of exposition are only one aspect of speech act theory, and since this study deals only with expository prose, we found Cicourel's categorization inadequate for our analysis of discourse.

Other categorizations, based on speech act theory, were more specific to our needs. Wilkins' (1976) communicative functions have a category called "rational enquiry and exposition" which includes definition, cause, reason, result, classification comparison, contrast, generalization." Notions of contrastive relations (e.g., equality, correspondence, contrast) and logical relations (e.g., conjunction, inclusion, cause, effect) are listed by van Ek (1975). Discourse connections in Leech and Svartvik (1975) include: initiate, digress, add, reinforce, summarize, generalize, exemplify. Based on these classifications, a list of communicative micro-functions was developed by Munby (1978). Communicative acts, also termed "rhetorical functions" by (Allen and Widdowson 1974), overlap with the illocutionary acts discussed by Austin (1962) and Searle (1969). The problem with these categorizations was that they contained much extraneous material that we did not need to use for the classifications of our own texts.

Other linguists have categorized discourse patterns in terms of conjunctions or connectives. Halliday and Hasan (1976) speak of conjunctive relations: additive, adversative, temporal, and causal. Beaugrande (1980a) sees these relationships as subtypes of junction: conjunction (additive), disjunction (alternative), conjunction (oppositional), and subordination (hierarchical or contingent) (p. 289). Included among van Dijk's (1972) connectives are: conjunction, disjunction, contrast, causality, and reason.

Viewing these relations in terms of logical connectors rather than as illocutionary acts emphasizes their semantic rather than their functional aspect. Theoretically sound as these categorizations may be, however, they are not thorough enough for our specific needs of examining expository written prose.

The categorization used in this study is based on lists of sentence types (Jones and Faulkner 1968, Larson 1967). Explicitly written to analyze prose style, they are based on the empirical examination of many expository prose paragraphs. It is interesting to note that this empirically based list includes categories from both illocutionary acts and conjunctive relations. The list of sentence types that will be used in this study includes the following: alternative, amplification, answer, cause, comparison, contrast, definition, evaluation, evidence, example, generalization, inference, parallel idea, question, related action, restatement, result, and summary.

In this study the term "sentence function" refers to the sentence level, whereas the term "illocutionary force" is used to refer to the paragraph level. The nonspecific general term that will be used to include both the semantic and functional components of speech acts, illocutionary acts, and sentence (rhetorical) functions will be "discourse patterns."

### 2) Cohesion (overt signalling)

Following the distinction made by Halliday and Hasan (1976), this study will examine separately the difficulties caused by grammatical and lexical cohesion. This is not an easy task since the distinction is not always clear-cut. Furthermore, it should be noted that as cohesion is one aspect of coherence (see above B.3.b., Cohesion vs. Coherence, pp. 41-42), so grammar is only one among several semantic devices (Olson 1972, pp. 148-49) in the reading processes. Goodman (1969) describes how the reader uses these devices:

> syntactic information:
>
> This is the information implicit in the grammatical structures of the language. The language user knows these, and therefore, is able to use this information before he learns to read his native language. (p. 17)
>
> semantic information:
>
> As he strives to recreate the message, the reader utlizes his experiential conceptual background to create a meaning context. If the reader lacks relevant knowledge, he cannot supply this semantic component and he cannot read . . . . All readers regardless of their general reading proficiency are incapable of reading some material in their native language. (pp. 17-18)

For EFL readers, whose vocabulary, if not their grammatical knowledge is limited, this problem is especially acute.

A study by Sim and Bensoussan (1979) suggested that for EFL students, function words (e.g., conjunctions, prepositions, pronouns) appear as difficult to master as content words (e.g., nouns, verbs, adverbs).

In contrast, among the list of devices to facilitate the integration of ideas from different sentences, Carpenter and Just (1977) list anaphoric reference, intersentential connectives (e.g., therefore, because, however), and repetition of key words (pp. 233-234). Likewise, Fishman (1978) views anaphora as aiding comprehension and taking less reading time because the information refers to recently activated structures in the memory. For EFL learners, however, these items may actually be obstacles to fluent reading.

This paradox is summed up by Tanenhaus and Seidenberg (1981):

> many of the stylistic devices that complicate sentence processing such as pronominalization, ellipsis, and subordination seem to facilitate discourse processing. (p. 212)

As there is disagreement in the literature concerning the effects of cohesive items on reading difficulty, and as the effects of different cohesive items may interact interdependently (Dillon 1978, Baten 1981), we will examine some of these cohesive items in more detail.

### a) Grammatical -- Anaphoric Reference

The finding of antecedents is listed by Davis (1972) as one of the important comprehension skills among mature native readers. Consequently, inability to understand anaphoric referents in a text would impede comprehension.

It was suggested by Levenston (1976) that grammatical anaphora would be problematic for native Hebrew speakers because Hebrew prefers not anaphora but lexical repetition:

> A Hebrew speaker, for example, who fails to follow the drift of an extended passage of English prose may be more baffled by the "excess" -- to him -- of anaphora than by any specific lexical difficulties. (p. 22)

Researching the effects of the presence or absence of items of grammatical cohesion in texts, Sim (1979) found that anaphora affected the reading comprehension facility of EFL university students. Examining scores of students of low English proficiency, Sim found that items of anaphora were difficult for these students to process. He also found that markers of grammatical cohesion affected difficulty more than did content words (items of lexical cohesion). For students of higher English proficiency, however, grammatical cohesion did not have so great an effect. In fact, sections of text containing anaphoric items were actually easier for these students than sections without the items.

Berman believes that EFL students may have difficulty with:

> relating pronouns to their relevant antecedents. This can lead to ambiguity of interpretation where none is intended, or to outright misinterpretation of parts of a text. (p. 248)

Frederiksen (1981) found that native English speaking high school students required more time when reading sentences which contained reference. The best predictors of text difficulty for college students were found by Dutka (1978) to be the length of the anaphoric referent (i.e., longer referents predicting greater difficulty) and the distance between the anaphoric item and its referent (i.e., the greater the distance, the more the difficulty in reading comprehension). Length accounted for 25% of the variance in test scores; distance accounted for 23% of the variance; length and distance together accounted for 36% of the variability. Researching advanced EFL students at Haifa University, Sim (1979) found similar results. He found that greater distance between the anaphoric item and its referent caused more difficulty. Greater complexity and length of the referent also appeared to cause reading difficulty. Furthermore, Sim (1979) found that cataphoric items presented greater difficulty than did anaphoric items. Repetition or redundancy of anaphoric items, however, was found to make reading easier.

Sim (1979) states:

> each factor alone (i.e., antecedent size and distance from the anaphoric item) does not seem to cause difficulty in reading comprehension . . . . But in combination, the two factors do appear to cause difficulty. (p. 189)

Nevertheless, other researchers (Hasan 1977, Baten 1981) did not find that anaphora affected reading difficulty.

Working with younger EFL students on a lower level of proficiency, Baten (1981) found that neither reference words (anaphora) nor conjunctions (logical connectors) affected reading difficulty (p. 70).

Fishman (1978) also found no significant effect of anaphora. She hypothesized that paragraphs containing anaphora would produce a more complete semantic representation of a paragraph in the memory of a reader than would paragraphs without such cohesive ties. Assuming that items of anaphoric reference present old information, she argues:

> Their presence in a text ought to help the reader organize material as it is read. Because references do not present new information such as that found in lexical items, the time required to read sentences and paragraphs containing references should be shorter than the time needed to read paragraphs containing lexical items rather than references. (p. 160)

Whether anaphoric reference is an aid to comprehension or an obstacle to certain readers under certain conditions is still an open question. This study will research the problem further.

### b) Lexical

#### 1) Content Words / Vocabulary

It is an obvious fact that the difficulty of the vocabulary in a text affects reading comprehension. What is not so obvious is how the effect of vocabulary difficulty compares with other variables in the reading process. In this study, changes in coherence (i.e., different order of sentences) are compared with changes in lexical cohesion (repetition, synonyms, superordinates, general words, lexical chains) and grammatical cohesion (changes in number and kind of reference words).

A pilot study of the latter two -- differences between lexical and grammatical cohesion, has already been carried out by Sim (1979). The results were contradictory. In two different sets of texts, Sim found the following hierarchy of difficulty:

> Thus logical connector items represented most difficulty; anaphora items came next in order of difficulty; and content words third. (p. 166)

Logical connectors were found to be the greatest obstacle to reading comprehension. Sim was surprised at the unexpected absence of difficulty where the content words had deliberately been made harder (p. 141).

In a third set of texts, however, the vocabulary factor was indeed more difficult. It was followed by logical connectors, with anaphora being least difficult. This last set of findings is what would be expected according to the literature (Klare 1976, Marshall and Glock 1978-79, Baten 1981, Neufeld and Webb 1981).

To add to the complexity of the problem of determining difficulty of vocabulary is the factor of context. Some words are difficult because they are unfamiliar. Other words are treacherously familiar but, used in unfamiliar contexts, they shift in meaning and may thus block comprehension of the text (Niles 1979, Nilagupta 1976). Students' preconceived notions about familiar words prevent them from correctly guessing different meanings of polysemes in unfamiliar contexts (Laufer and Bensoussan 1982, Bensoussan and Laufer 1984).

### 2) Redundancy: repetition (reiteration), synonyms, lexical chains

In any text, there are many redundant cues which are vital to comprehension (Schlesinger 1977, Smith 1978). It is assumed that the reader picks up the cues and makes use of the redundancy during the process of reading comprehension while storing the information in the memory (Weaver 1962).

In the course of the text, a writer may use the same idea more than once. Referring to this idea of reiteration, Halliday and Hasan (1976) explain that the writer may either repeat the same word, use a synonym, or insert a pronoun. It is possible for writers to substitute any of these kinds of words because they can assume that readers have prior knowledge not only about the ideas but also about the words which represent them. It is generally assumed that when words are repeated, the reader's task is easier than when synonyms or pronouns are used (Flesch 1950). When the same word is repeated, or when the same idea is repeated by means of synonyms, the repetitions form a lexical chain:

> It may mean that the words used in one text, which form lexical chains, can be perceived by the reader as 'belonging' together and therefore do not require from the reader that they be processed as completely new lexical items. Thus, if more words of one text belong to the same lexical chain(s), then less processing demands occur. This implies that less long term memory searches are necessary, and/or less load is laid on the short term memory activity. (Baten 1981, p. 68)

The effect of redundancy on reading comprehension will be further researched during the course of this study.

## D. MEASURING TEXT READABILITY

### 1. Disadvantages of Readability Formulas (see above A.2., pp.19-21)

#### a. Surface Factors of Prose and Meaning

Many researchers argue that the readability formulas, dealing only with the surface structure or stylistic aspects of a text, neglect its meaning or content (Meyer 1975, Brown 1976, Hirsch 1977, Beaugrande 1980, Klare 1982 + 1984 Baten 1981). Moreover, since the formulas are not based on any theory of language, there is no way to develop hypotheses for improving them (Bormuth 1967, Irwin and Davis 1980). Nor do they reflect text organization. Consequently, formulas cannot discriminate between scrambled and well-ordered sequences (Kintsch and Vipond 1977). Researchers (Bormuth 1976, Kintsch and Vipond 1977) have pointed out that readability formulas only show correlations, but they do not explain the causes of reading difficulty. Nor do different formulas correlate highly among themselves (Klare 1982 and 1984.

Most formulas are based on word length and sentence complexity. Yet Rothkopf (1972) claims:

> sentence complexity and lexical factors such as frequency of use have small effects on what is learned from text by adults providing that inspection time is not limited. (p. 320)

### 1) Sentence Length and Complexity

According to Dale and Chall (1948), longer sentences usually make comprehension more difficult. These findings were recently borne out for advanced EFL students by Sim (1979).

Schlesinger (1966), however, disagrees, arguing that sentence length has little effect on readability (pp. 92-93). He admits that longer sentences are often more complex:

> it may be that a tendency exists among writers to use longer -- and possibly also more complex -- sentences when treating of more difficult subject matter. (p. 86)

He also states that short sentences are more redundant, and therefore easier than long sentences (p. 87). It was found, however, by Bensoussan (1980) that it is often the long sentences that are redundant and the shorter ones that contain anaphoric references that may concentrate a phrase, a sentence, or a whole passage into a single pronoun or pro- verb. Other researchers (Bormuth 1966, Herriot 1970, and Baten 1981) have also explained that the longer sentences are not necessarily the more complex ones, and that these two factors (sentence length and sentence complexity) are separate and independent measures of readability.

### 2) Word Length and Familiarity / Frequency

Gilliland (1970) found word length not very useful as an isolated measure of readability (p. 414). Rothkopf (1972) explains that average word length reflects the structure of the sentence as well as the characteristics of the individual word because it is influenced by the number of function words and personal pronouns in the text. For this reason word length is not a simple indicator of meaningfulness and familiarity (p. 317) Baten (1981) also explains that word length only influences reading ease directly if the longer word is morphologically more complex (p. 51).

Dale and Chall (1948) and van Parreren and Schouten-van Parreren (1981) have argued that unfamiliar words are another factor making comprehension more difficult. For this reason word lists of familiar words have been compiled. The objection here is that the concept of word familiarity is subjective, since a general frequency count cannot show how familiar a word is for any given individual (Gilliland 1970, Baten 1981).

This lack of one-to-one correspondence is even more crucial for EFL students, whose vocabulary is dependent on their educational background and not necessarily similar to that of other nonnative speakers, or to that of the native speakers for whom (and from whom) the word counts were originally produced.

### b. Readability Formulas and the Reader

Readability formulas pay no attention to the psychological processes in reading comprehension. They merely predict language difficulty (Bormuth 1976, p. 487). Other researchers agree that the formula fails to deal with the process of reading (Irwin and Davis 1980, Baten 1981, Klare 1982 + 1984).

The formulas take into account only the average group of readers (Baten 1981, p. 150). Some researchers (Dale and Chall 1948, Rothkopf 1972, Klare 1976 1982 + 1984) explain that the formula takes into account neither the readers' knowledge of a particular subject nor their intellectual and maturity levels. For these reasons Laroche (1979) says that the formula is unsuitable for foreign language material. It does not take into account the student's linguistic problems with the language but rather

> presupposes an intuition of the syntactic, lexical and stylistic resources of the target language. (p. 134)

### c. Accuracy

According to Bormuth (1976), readability formulas are not very accurate, having validity correlations of only about .5 to .7 (p. 485). Other researchers (Gilliland 1970, Baten 1981) have also found them inaccurate. Stokes (1978) found that they are not very reliable.

Klare (1963) gives one reason why prediction of readability is low for reading levels:

> These levels are in terms of materials of average difficulty for average students of a given grade, and are usually based on the results of standardized tests. In some cases, the criterion of understanding of a passage is correct answers to 75% of the comprehension questions, in other cases to 50%. This in itself is responsible for some formula error, at least insofar as differences among formula ratings are concerned. As indicated earlier, agreement on a standard level is needed. (p. 175)

Moreover, the higher the educational level, the less accurate the reading formulas appear to be (Klare 1963, 1976, 1982 and 1984). Readability formulas are apparently most accurate on the level of elementary education (Hirsch 1977).

Considering the weaknesses of the readability formula, researchers agree that it should be used in conjunction with other measures of readability (Klare 1963, Meyer 1975, Hirsch 1977). For this reason, the difficulty of texts examined in this study will be measured in a variety of ways in addition to using readability formulas.

## 2. Cloze Tests as a Measure of Readability

According to Corrigan and Upshur (1982), test method is one factor that influences test results. In order to avoid the undue influence of any one test, therefore, different testing methods will be used to measure text comprehensiblity for advanced EFL students. In addition to the Flesch Reading Ease Formula and discourse analysis, the cloze procedure will also be used.

### a. Definition of 'Cloze'

The term 'cloze' first appeared in an article by Taylor (1953) as a better measure of readability than readability formulas. Taylor recommended random deletion to sample the ability of a student to comprehend a text. Oller and Conrad (1972) explain the reasoning behind the 'cloze' procedure:

> The term 'cloze' was used with the notion of Gestalt "closure" in mind, referring to the natural human psychological tendency to fill in gaps in patterns. The restoration of words deleted from a selection of prose in order for the passage to make sense is a special use of this ability to complete broken patterns. (p. 183)

Carroll (1972) explains Taylor's procedure:

> The procedure involves taking a passage of text and deleting words in it by some rule, e.g., every 5th word, every other noun, or every other "function" word. A subject is then presented with the passage and asked to guess the missing words. (p. 18)

Although linguistic criteria (parts of speech or function words) may enter into the cloze procedure, it is the randomness, and not the structure of the text, that counts. From this automatic, mechanical deletion process sprang a whole literature which applied this procedure to a large variety of texts and students, making claims for its performance, criticizing its effectiveness, and suggesting modifications in scoring methods and deletion rates. Since this study will use the modified rational cloze as one of the methods to verify the difficulty level of texts, we will give a general outline of the literature on the cloze to date, and explain the basis on which it will be used here.

### b. Reasons for Advocating the Cloze

A number of researchers (Taylor 1953 and 1956, Gilliland 1970, Hirsch 1977) see the cloze procedure as an accurate measure of readability for two reasons: it includes the reader, and it makes use of semantic and syntactic redundancy in the text (i.e., the context) in the calculation of the readability score. That is, it corrects some of the faults of the readability formulas.

Redundancy, as defined by Klare (1963) refers to "the extent to which a given unit of language is determined by nearby units" (p. 172). Like readability, perception of redundancy varies not only with the materials, but also with the readers (Klare 1963, pp. 173-174).

Some researchers claimed that the cloze is a global measure of language proficiency for native speakers of English (Weaver 1962 and 1965, Bormuth

1967 and 1968, Ramanauskas 1972, Oller 1975, and Ozete 1977). This claim was soon extended to include nonnative speakers of English as well (Oller and Conrad 1972, Oller 1973, Irvine et al. 1974, Stubbs and Tucker 1974, Jonz 1976, Chihara et al. 1977, Berkoff 1979).

### c. Problems with the Random Cloze Procedure

Not all researchers are enthusiastic about the cloze as a global measure of reading proficiency, however. Kintsch and Vipond (1977) do not believe redundancy and readability to be closely related:

> The cloze procedure, on the other hand, is probably actually misleading. It measures the statistical redundancy of a text, which is a far cry from its comprehensiblity. By that score, a high-order statistical approximation to English that nevertheless constitutes incomprehensible gibberish would be preferred to a well-organized text with less predictable local patterns. (p. 337)

Other researchers are also skeptical of the random cloze procedure (Carroll 1972; Porter 1975; Alderson 1969, 1979, and 1980; Baten 1981; and Klein-Braley 1981).

Opponents of the random cloze present a list of drawbacks. They state that it does not measure what its promoters say it does. Language production being necessary, it is not only a measure of reading ability (Porter 1975). Changes in deletion rates can alter the test unpredictably, so that it cannot be universally applied to every text (Alderson 1969, 1979, and 1980; Klein-Braley 1981). It is not a test of global comprehension across sentence boundaries but a discrete item test that is sentence (or even clause) bound (Alderson 1969, Carroll 1972, Klein-Braley 1981). Random cloze tests do not always distinguish between natives and nonnatives (Alderson 1980) since even natives also have difficulty filling in the cloze and are not necessarily able to get a perfect score (as would normally be expected on a test for foreign language learners).

### d. Modified Rational Cloze

Having rejected the random cloze as not being an automatically valid testing procedure, a number of researchers suggested rational deletion methods according to linguistic principles (Weaver 1962, Greene 1965, Alderson 1969, Cranney 1972-73, Klein-Braley 1981). Greene (1965) explains the rationale behind a modified cloze test which he constructed:

> each possible deletion was evaluated by the author for possible effectiveness and deletions made on this rational rather than mechanical basis. For each word deleted under the modified cloze procedure, there was felt to be sufficient redundancy remaining in the passage so that a superior reader could make positive identification of the missing word. (pp. 213-214)

Other researchers advocate deleting certain parts of speech (Weaver 1962, Klein-Braley 1981) or a certain percentage of content vs. function words (Berkoff 1979).

Working with nonnatives, Bachman (1982) deleted on the basis of syntactic (clause-level context), cohesive (inter-clause or inter- sentential context), or strategic (parallel) patterns of coherence (p. 63). Also working with EFL students, Berkoff (1979) and Sim (1979) experimented with rational cloze to test comprehension of items of coherence and cohesion.

In this study, the rational cloze is used, with deletions determined according to the criteria set by Greene (1965) based on sufficient redundancy to make sense to the competent native reader.

## 3. Multiple-Choice (M-C) Tests as a Measure of Readability

### a. The Function of M-C Tests

Comprehension is most commonly measured indirectly by asking questions about the text (Meyer 1975, p. 7). There is an assumed relation between students' comprehension of a passage or text and their ability to answer questions on that passage or text (Davies 1968, Carroll 1972, Kintsch and Vipond 1977, Sim 1979). That is, comprehension test scores are expected to reflect level of reading comprehension. In technical terms, this means that test writers make a model of the text. They also ask questions that reflect comprehension of the text and decide on model correct answers. During marking, the test-writer's model is compared with students' answers (Frederiksen 1972): the smaller the difference (i.e., the closer the students' performance to the model answers), the higher the scores and the more reading comprehension is assumed to have occurred.

Multiple-Choice (M-C) tests are one type of reading comprehension test where the possible answers are already given to the student. The examinee is required to select the correct answer from a number of alternative responses (Cohen 1980). It is a test purely of reading and thinking; no writing is required.

Short-answer or open-end comprehension questions involve writing and are more difficult to mark. Furthermore, Sim (1979) found that for advanced EFL university students, no significant difference appeared between scores on questions in M-C and open-end formats. Sim (1979) showed that question format affected neither the difficulty nor the effectiveness (i.e., the Discrimination Index) of test questions.

### b. Constraints of M-C Questions

#### 1) Relation Between Comprehension of Text and Correct Responses to Questions

Many researchers have criticized the M-C test format because they question whether correct responses on questions accurately reflect reading comprehension (Gilliland 1972, Tuinman 1973). Sim (1979) found a Pearson correlation of only .29 between the Flesch Reading Ease Formula for difficulty of texts and the percentage of correct student answers to questions. Nevertheless, Henning (1975) found M-C questions to be a valid measure of foreign language reading comprehension. Bormuth (1969) found that M-C scores correlated highly with cloze scores.

#### 2) The Test Writer's Ability to Define Question Function

Meyer (1977) complains of a lack of theory on which to base the writing of questions on texts. Other researchers (Fishman 1978, Sim 1979, Baten 1981), however, have based much of their research on M-C questions. Sim (1979, p. 94) lists a taxonomy of ten question types for the function of comprehension questions:

1. main idea of passage
2. main idea of paragraph
3. comprehension of sentence or sentence pair
4. use of examples or comparison
5. implication or inference
6. word meaning
7. referential system
8. logical relations
9. language of caution and approximation
10. ability to paraphrase

Questions which can be classified according to this taxonomy will also be used in this study.

### 3) Sensitivity of Questions to Specific Points in the Text

Without directly asking the meaning or reference of a particular word or phrase, it is difficult to write comprehension questions so specific that they can pinpoint difficulty in particular sections of text (Klare 1976, Sim 1979). The danger here, according to Sim (1979), is that by drawing attention to the specific point, the test writer may actually cause a specific test difficulty where no text (i.e., reading) difficulty existed before it was directly questioned (see also Corrigan and Upshur 1982).

In order to avoid the creation of artificial obstacles by test interference in the reading process, we decided in this study to ask mostly general comprehension questions. The kind of question we have not asked is:

> "this" (line --) refers to: 1) study 2) test 3) obstacle 4) comprehension

On the other hand, we have asked content questions on sections of text containing reference items.

### c. Problems with the Text

#### 1) Motivation and Choice of Subject Matter

Even outside the test situation, different texts affect different readers in various ways. It is assumed that the more prior knowledge about a subject readers bring to a text, the more readily they can read that text (see above C.2.a.2), The Reader's Contextual Frame(s), pp. 56-57). According to Klare (1976),

> where knowlege of content is very high before reading, the effect of improved readability may be washed out....
>
> It may sound obvious to say that subjects can have too high a level of background and knowledge for the effects of readability to be clearly shown. (p. 144)

In addition, the emphasis on grading in the test situation also appears to distort the significance of motivation by subject matter only. According to Klare (1976), the reader motivation factor can cross test results. Working with texts varying in difficulty, he found significant differences in comprehension scores only when the students were not highly motivated.

That is, when students were highly motivated, they were more likely to correctly answer questions even on difficult texts:

> Where a priority is desired, it pays more to improve the readability of low-preference rather than higher-preference material; the effects on reader behavior are likely to be more notable. (p. 142)

Klare suggests that in the interpretation of test scores, the researcher should take into account the reader's intellectual level, maturity, background information, and motivation. For foreign language learners, a final addition to this list would be language proficiency.

### 2) The Technique of 'Doctoring' Texts

Working with authentic texts, the researcher has a problem, for they do not always contain many instances of the linguistic feature which is being examined. According to the literature (see above B.1.b.3) Alternative Versions of Text, p. 27, and 4) Text vs. Context, pp. 28-29), different versions of a text may be written. Furthermore, if there is to be an 'experimental' text, including the linguistic items to be examined, and a 'control' text which does not include them, the researcher is required to re-write or 'doctor' the text so that it is acceptable in both the original and the doctored versions.

In the doctoring process, this study isolated certain features which were expected to affect reading comprehension difficulty. One version, the 'doctored,' contained as many items of a given feature as it was possible to include without rendering the text stylistically unacceptable, whereas the 'original' version, as far as possible, did not contain these items.

The doctoring technique has already been used by other researchers. Fishman (1978) used the doctoring technique to research reference and noun phrases. Sim (1979) used it to examine reference, conjunctions, and sentence length. Both researchers also used M-C comprehension questions with each text to evaluate reading comprehension. The results, however, were not always conclusive because of the impossiblity of completely separating overlapping effects of other syntactic and semantic influences in the text (Weaver 1965). To this reason for inconclusive results we might add reader motivation (see above D.3.c.1), Motivation and Choice of Subject Matter, pp. 91-92).

### 4. A Variety of Measures

Because of the complexity of the reading process, no one measuring device or language comprehension test can be relied on to show any particular linguistic feature as a cause of reading difficulty. According to Carroll (1972),

> There is no one technique that universally gives valid and reliable information. It is seldom the case that success or failure in any of these tests can unequivocally be traced to success or failure in language comprehension since there are other factors of guessing, inference, memory, reliance on prior knowledge, etc., that are operating. The influences of these other factors must be controlled as characteristics, control of temporal factors, and instructions to the subject. (p. 24)

In the light of this warning by Carroll, this study used a variety of techniques (Cloze, M-C, Flesch Reading Ease Formula, Discourse Analysis) on the assumption that taken in conjunction, these devices will yield a general picture of what causes reading difficulty for foreign language learners.

## E. SUMMARY

This chapter presents an overview of the literature on discourse analysis, the process of reading comprehension, and testing techniques. It provides the basis for the analysis of texts and the interpretation of experimental results. We have given the theoretical basis for our application of reading comprehension theory to the texts examined in this study.

Most linguists see cohesion and coherence as separate entities in discourse theory. In the processes of doctoring texts, writing test questions, and analyzing texts, we have usd the classification of cohesion presented by Halliday and Hasan (1976) and the aspect of coherence that pertains to the order in which information is presented (see Canale 1982). We have categorized sentence types along the lines of speech act theory.

To apply the theory to the problems of reading comprehension, we turn to the theories of reading processes. Two major trends appear in the literature: the schema (macro-proposition) theory, whereby sentence order would not matter since the reader provides the missing links in a discourse, and the micro-proposition theory, whereby sentence order does matter since each new bit of information modifies the given information before it. Recent research indicates that there is no real contradiction here and that both processes may occur simultaneously.

The question remains as to which type of paragraph or text structure is more easily or efficiently read: the top-down text where the main ideas appear first or the bottom-up text where secondary ideas or examples appear first and the main idea comes at the end as a sort of conclusion.

Various methods of testing reading comprehension will be used to answer these questions: discourse analysis, the technique of doctoring texts, a readability formula, M-C tests, and rational cloze. This chapter describes the advantages and disadvantages of each method so that results can be interpreted accordingly. Given these tools, we will attempt to determine the effect of certain textual conditions on our EFL students' ability to read expository texts.

# NOTES TO CHAPTER TWO

1. What van Dijk calls *context*, Halliday and Hasan call *text*.

2. Reading each sentence in sequence, the reader receives the information in a particular order and forms an idea of what the text is about. If the order of the sentences in a given text were changed so that it still made sense, the information would still be the same. But the context in which this information appeared would change. Perceiving the ideas in a different order, the reader would have a different picture of the focus of the reordered text. Thus one would suspect that the original text and its alternative doctored version (i.e., in a new context) could not be considered equivalent.

3. Van Dijk (1977, p. 7, note 4) observes that the notion of macro-structure was first used by Bierwisch (1965) for specific (e.g., narrative) structures of discourse. Since then it has been discussed by van Dijk (1972, 1975), Kintsch and van Dijk (1975), and van Dijk and Kintsch (1977), among others.

Beirwisch, Manfred (1965) "Poetik und Linguistik," in Helmut Kreuzer and Rul Gunzenhauser (eds.) *Mathematik und Dichtung*. *Versuche zur Frage einer exakten Literaturwissenschaft* (Munich: Numpheburger). Kintsch and van Dijk (1975) "Comment on se rappelle et on résume des histoires," *Languages*, *40*, 98-116.

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# CHAPTER THREE

# METHODS

## A. OVERVIEW AND BASIC ASSUMPTIONS

One purpose of this study is to determine whether advanced EFL students' difficulty in reading English texts is affected by certain features of cohesion and coherence. Since reading difficulty is not always measured in the same way, more than one method was used in this study to evaluate the reading problems of first-year students at Haifa University. These methods included a readability formula, a number of reading comprehension tests (including multiple-choice (M-C) comprehension questions and modified rational cloze procedure), and discourse analysis.

The researcher assumed that it was possible to write texts containing sufficient features of cohesion (e.g., pronouns, ellipsis, repetition) so that the cumulative effects of cohesion and coherence in a text could be measured. A section of each text version was processed through the Flesch Reading Ease Readability Formula (Klare 1963) to quantify and measure the stylistic differences caused by the doctoring procedure.

It was also assumed that students' interpretation of features of cohesion would affect their reading comprehension of the whole text, and that the students' ease or difficulty in reading would be reflected in their ability to answer comprehension questions on the text. That is, wrong answers to questions were taken as reflecting some misunderstanding of the text. Underlying this assumption was the belief that the tests were reliable and that the M-C questions were fair and unambiguous in themselves and would not present an additional obstacle to reading comprehension.[1]

Another assumption of this study was that some features of coherence and cohesion would cause more reading difficulty than others, and that the readability formula applied to the text, along with the test results, would provide evidence to indicate the problematic types of items. It was hoped that differ‾ances among text versions, as indicated by both readability formulas and test results, would be statistically significant, either on the macro- (whole-text) level or the micro- (word and sentence) level, or both. [2]

Since the test scores could only be meaningful in relation to the texts from which they resulted, techniques of discourse analysis were used to describe the logical sequence within each text version. Changes in rhetorical patterns and semantic relations in the text versions were then compared with the test results.

All tests were constructed by the researcher as mid-year and final examinations in the Department of Foreign Languages for the required advanced EFL reading comprehension course. Teachers in the department made comments and corrections on the tests.[3] In this sense, the experimental function of the tests was secondary to their administrative function. Thus, student motivation was high because approximately 20% of the final mark depended on these test results.

A total of 27 tests were administered (24 versions of the six texts plus three of the original ("undoctored") text versions). The same 20 M-C questions accompanied all the versions of a text. When the sentences in a text were reordered, the position of the questions was also changed according to the text.

Two separate sets of tests were used: Tests 1-4 were the end of mid-year (first-semester) examinations in January 1978, 1979, and 1980. They were administered after the first half of the EFL reading comprehension course (50 hours of instruction). Tests 5 and 6 were administered in June 1980, 1981, and 1982 as final examinations afer the second half of the course (100 hours of instruction).[4] Each test took the duration of a class period (two hours) to complete.

It was assumed that differences in student scores of M-C and of cloze tests would be related to the different text versions created by the "doctoring" procedure. In addition to total test scores, however, other measures of text difficulty were also used. Specific M-C questions relating directly to doctored sections of text were examined separately. If differences in reading difficulty did not appear on the whole-test level, they might nevertheless be revealed by student responses on the single-question level.

Every attempt was made to achieve uniform test conditions. Examinations were administered during the last week of the semester, with the teachers acting as test proctors. To avoid cheating over the three-day test period, however, we administered a series of parallel tests. Teachers decided which of the text versions they wished to administer to their classes. In many classes, teachers chose more than one text version. In this way, tests were not administered to the students at random but rather by teachers' choice. Because of this method of test distribution, however, the researcher had no control over the number of text versions administered.[5] For this reason, the numbers of students taking each text version was not equal.

For all tests, students were permitted to use dictionaries (both monolingual and bilingual) since it was shown in a study by Bensoussan, Sim, and Weiss (1981) that the use of dictionaries does not significantly affect M-C test scores. Test questions were written bearing in mind the use of dictionaries. It was decided to permit the test situation to reflect the normal reading situation where students would normally refer to dictionaries.

## B. RESEARCH DESIGN AND DATA COLLECTION

### 1. Subjects

In this study, the term "advanced reading comprehension" refers to the reading proficiency of first-year undergraduates studying in the Humanities and Social Sciences Departments at Haifa University. These students, who studied seven or eight years of English in high school, were attending the required English reading comprehension course during the time of the research.

Tests were administered to approximately 3,600 students. The native language of most of the students was Hebrew or Arabic. While the students taking the tests during this research study changed each year, the size of the yearly population (approximately 600) remained constant. It was assumed that, on the average, the English proficiency of the students was on the same level each year.[6] This research study was carried out over a period of five years (1978-1982). Since the tests were an integral part of the course, motivation was expected to be high.

### 2. Procedures to Determine Text Difficulty

#### a. Flesch Reading Ease Readability Formula

As stated above, Chapter Two, p. 20, the readability formula that was used in this research was the Flesch Reading Ease Readability Formula (Klare 1963)[7]:

$$\text{Reading Ease} = 206.835 - .846\,wl - 1.015\,sl$$

where wl = the number of syllables per 100 words
sl = the average number of words per sentence

This formula was applied to the first 100 words of each of the text versions.

Although easy to apply, readability formulas have the following disadvantages:

1. No attention is paid to the psychological process of reading comprehension. Correlations are shown but not causes of reading difficulty.
2. Research data on the formula is based on native readers, not EFL learners.
3. Formulas are not very accurate or reliable.
4. Formulas deal only with the surface structure of the text and neglect its content, meaning, and organization.

For these reasons, in this research the findings of the readability formula were used in conjunction with other measures of text difficulty (see Appendix C, Table 1, "Texts Ranked According to Flesch Reading Ease Formula").

### b. Tests

Six different texts were tested in the study. Expository texts of general interest were chosen because that was the kind of text that was taught and tested during the EFL reading comprehension course. Topics were selected to be as culturally neutral as possible so that no students would be penalized for unfamiliarity with the subject matter of the text, and no students should have unfair advantage because of specialized knowledge or culture bias. The difficulty of the texts was assumed to be based on language rather than on ideas.

Each text was rewritten ("doctored") in four different versions. Two of the versions appeared in the original order but contained mostly either items of grammatical or of l$_{1}$exical cohesion (as defined by Halliday and Hasan 1976). In the other two versions, the sentences were reordered so that they still made sense, but the information was presented in a different order. These two versions also contained mostly either items of lexical or of grammatical cohesion.

The four text versions were as follows:

1. OL - Original Lexical Version
2. OG - Original Grammatical Version
3. RL - Reordered Lexical Version
4. RG - Reordered Grammatical Version

For the main part of the research, each text version was accompanied by 20 M-C questions. As there was a large number of students to tests, it was decided to use the M-C format because it was easy to score and the results could be readily analysed by computer.[8] For another part of the research, to compare original and reordered versions of text, rational cloze procedure was used. For a sample of an original text, four versions with M-C questions, and two cloze versions, see Text 2 in Appendix B.

## 1) Test Formats

### a) Multiple-Choice (M-C) Reading Comprehension Questions

One purpose of the M-C questions was to examine reading comprehension in sections of text which contained items of lexical and grammatical cohesion. Unfortunately, it was not always possible to write in enough cohesive items without distorting the style of the text. Moreover, it was not always possible to ask enough good questions on the doctored sections of text. For technical reasons, then, there were certain doctored sections of text on which no specific content questions were asked.

Furthermore, in order to complete the desired number of 20 questions, other types of questions had to be included. Word level questions (e.g., "For" (line . . .) means . . . ) and whole-text level questions (e.g., "A possible title for this text would be . . . ") were included for this reason.

The total test score resulted from responses to 20 M-C questions, only a certain number of which directly related to doctored sections of text. For this reason, those questions specifically relating to items of cohesion in the text were examined separately.

### b) Rational Cloze Procedure

As an alternative testing procedure, the rational cloze method was used to compare original and reordered versions of undoctored Texts 1-3.[9] The cloze technique was chosen because it includes less material extraneous to the text. Unlike M-C format, the cloze omits questions and required the student to fill the blanks occurring in the text itself.

Words were deleted by the researcher according to the redundancy of the context. Blanks were selected where there was enough surrounding context to enable a reader to guess the missing word(s). The same blanks appeared, except for the first and last sentences of each text version, in both original and reordered text versions. The number of blanks for Texts 1, 2, and 3 was 46, 38, and 50, respectively.

The modified cloze tests were administered during the years 1981 and 1982 when the departmental M-C tests were not given. Thus we could be certain that students had not been exposed to the original intact versions of text.

### 2) Doctored Text Versions

#### a) Cohesion: Lexical (L) vs. Grammatical (G) Versions

For each of the six texts, there were two versions containing items testing text cohesion: one version including mostly items of lexical cohesion, and one version containing mostly items of grammatical cohesion. (It was not possible to totally exclude items of lexical cohesion, for example, from the grammatical version of a text without distorting its style and making it sound unnatural.) For a breakdown of the number of items of cohesion in each text version, see Appendix C, Tables 2 and 3, "Items of Grammatical and Lexical Cohesion in Original and Reordered Texts." See also Chapter Five, B.1.a., "Constraints on Test Development," pp. 173-175.

Items of cohesion were inserted according to a modified version of the classification by Halliday and Hasan (1976):

grammatical cohesion

1) repetition of pronoun reference (e.g., it, his)

2) reference - personal pronoun (e.g., it, his)

3) demonstratives (e.g., this, that, those)

4) nominal substitution (e.g., one, some, few)

5) verbal substitution (e.g., do, have)

6) clausal substitution (e.g., so, not)

7) ellipsis

8) exophoric (extra-textual) reference

lexical cohesion

9) repetition of noun reference
(e.g., The booklet ... the booklet)

10) synonym, near-synonym
(e.g., The booklet ... the pamphlet)

11) superordinate, subordinate
(e.g., The booklet ... the publication)

12) general word
(e.g., The booklet ... the material)

This study separated lexical and selected features of grammatical cohesion to determine whether either one, by itself, or both together, could be shown to affect reading comprehension. Each of the first four texts, then, appeared in three versions: original, doctored lexical version, and doctored grammatical version. The three versions of text varied in length: 490 to 512 words for Text 1, 413 to 446 words for Text 2, 612 to 660 words for Text 3, and 753 to 773 words for Text 4. No original version was tested for Texts 5 and 6; there were 529 to 613 words for the two versions of Text 5, and 570 to 637 words for Text 6. The difference in number of words ranged from 20 words (Text 4) to 84 words (Text 5). This difference was a result of the changes in phrasing, or of the repetition or omission of words caused by using mainly lexical or mainly grammatical cohesion in the "doctoring" procedure.

It appeared that the shortest, most concentrated versions were usually those of grammatical cohesion (except for Text 4, where the lexical version was five words shorter). This phenomenon raises the question of whether there is a connection between the concentration of text and the difficulty of reading comprehension.

Below is a sample paragraph from Text 3 in the original and two versions doctored for cohesion.

Original version:

> To distinguish between perception of the comic in oneself and in others, Gordon Allport has labeled the former a "sense of humor" and the latter a "sense of the

comic." A sense of humor, therefore, is the ability to see oneself objectively and to be amused by one's inferiorities, jealousies, and unsocial desires. It is, in short, the ability to laugh at oneself. A sense of the comic, according to Allport, is a "cruder" source of mirth in which enjoyment is derived from the inferiorities of others -- inferiorities which make the observer feel superior.

Grammatical version:

To distinguish between a person's perception of the comic in himself and in others, Gordon Allport has labeled the former a "sense of humor" and the latter a "sense of the comic." The former, therefore, is the ability to see himself objectively and to be amused by his own inferiorities, jealousies and unsocial desires. It is, in short, the ability of a person to laugh at himself. The latter, according to Allport, is a "cruder" enjoyment which is derived from the inferiorities of others which make him feel superior.

Lexical version:

To distinguish between perception of the comic in oneself and in others, Gordon Allport has labeled the perception of the comic in oneself a "sense of humor" and the perception of the comic in others a "sense of the comic." A sense of humor, therefore, is the ability to see oneself objectively and to be amused by one's inferiorities, jealousies, and unsocial desires. A sense of humor is, in short, the ability to laugh at oneself. A sense of the comic, according to Allport, is a "cruder" source of mirth in which enjoyment is derived from the inferiorities of others -- inferiorities which make the observer feel superior.

Changes in cohesion have been made according to the following principles. In the doctored grammatical version, the pronouns "former" and "latter" have been used for "sense of humor" and "sense of the comic." The "observer" is referred to as a "person" and all pronouns refer to him (rather than one or oneself). In the lexical version, all the nouns and noun phrases have been repeated.

Below is another example, also taken from Text 3:

Original version

Some laughter has a malicious quality: Laughing in triumph over an opponent, laughing at one's own "superiority," or laughing at another's discomfort is quite different -- in both meaning and tone -- from laughing with another person.

Lexical version

Some laughter has a malicious quality: jeering in triumph over an opponent, joking at one's own "superiority," or jesting at another person's discomfort is quite different -- in both meaning and tone -- from laughing with another person.

Grammatical version

Sometimes it has a malicious quality: Laughing in triumph over an opponent, at one's "superiority," or at another's

> discomfort is quite different -- in both meaning and tone -- from doing it _with_ another.

In the lexical version, synonyms of _laughter_ are used: _jeering_, _joking_, and _jesting_. In the grammatical version, the pronoun _it_ was used instead of the noun _laughter_. Mostly, the noun was omitted (ellipsis) or referred to obliquely as _doing it_ (verbal substitution and repetition of pronoun). The pronoun _another_ was also used instead of the noun phrase _another person_.

In order to ascertain that the two doctored versions of each of the six different texts would be equivalent in acceptability of meaning and style, they were presented for criticism to four teachers in the Department of Foreign Languages at Haifa University and changes were made according to their comments.[10]

### b) Coherence: Original (O) vs. Reordered (R) Versions

It was assumed that the sequencing of information affects the ease with which it can be processed. The same information, presented differently, might focus differently or shift the argument (see Chapter 2, B.1.b.3) and 4), pp. 27-28). It was assumed that reordering the sentences would result in a rearrangement of the sequence in which information appeared in the text. Each text appeared both in the original order and the reordered sequencing (see Appendix C, Table 4, "Key to Rearranged Sentences: Reordered Coherence;" Tables 4a and 4b, "Parallel Questions, Texts 1-6"). If the differences in sequencing affected total test scores, that would reflect their effect on comprehension.

For a sample test that was reordered, see Appendix B, Test 2. All five versions of Test 2 are included: Original (OO), Grammatical (OG), Lexical (OL), Reordered Grammatical (RG), Reordered Lexical (RL). The two sets of questions (original and reordered) have also been included. Appendix B also includes the modified cloze test version of Test 2 (see Appendix C, Table 4, "Key to Rearranged Sentences: Reordered Coherence).

### c) Cohesion and Changes in Sentence Sequence (Coherence)

In the reordering process, the words were not changed. Sentences appeared in the text in a different order. Except for Text 5, where three of the sentences had to be reordered from within (clauses placed in a different order) to maintain the natural flow of the discourse, the sentences themselves remained intact. However, as a result of changing the order of the sentences, cohesive ties were altered. A reference item of grammatical cohesion, for example, may have had a different referent because the previous sentence had been changed. Here is an example from Text 2:

Original Grammatical Version (OG), paragraph 5

A few are considering direct legal limitations on family size and sanctions to enforce them. No governments really want to resort to this. (lines 46-49)

> Reordered Grammatical Version (RG), paragraph 2
>
> A number of governments are moving in the direction of coercion. No governments really want to resort to this. (lines 11-13)

Each of the paragraphs appears at a different point in the text. Some of the sentences that appear in the last paragraph of the original version appear in the second paragraph of the reordered version. In the original version, they appear in the conclusion as alternative but unsatisfactory solutions. In the reordered version, they initiate a discussion of a possible solution. The position of M-C questions pertaining to this section of text, moreover, is also changed. It is no. 16 in the original test version and no. 6 in the reordered version (see Appendix B).

Another example is taken from Text 6:

> Grammatical Version (OG), selections from paragraphs 1, 2, 3
>
> (1) In studying the history of the relationship between East and West, we come to realize that there have been alternating phases of Oriental and Western ascendancy.
>
> (2) ... And this creates the vacuum into which another and more virile civilation is drawn.
>
> (3) For East and West, their periods of high civilization have never been simultaneous. Instead, they have alternated, the decadence of one coinciding with the highest achievements of the other. In its decay, each civilization creates a cultural vacuum into which the forces of the rival -- and rising -- one must tend to flow. These alternate phases assume a military form -

- the conquest of one nation by another. We are at first inclined to see these conquests as the overspilling of energy, the exuberance of an achievement which can no longer be kept within its original frontier. Such events do undoubtedly occur; but further study may incline us to think that the vacuum is the more powerful force.

Lexical Version (OL), selections from paragraphs 1, 2, 3

(1) In studying the history of the relationships between East and West, we come to realize that there have been alternating phases of Oriental and Western ascendancy.

(2) ... And this decay creates the vacuum into which another and more virile civilization is drawn.

(3) For East and West, the times of thriving culture have never been simultaneous. Instead, there have been successive epochs of dominance, the decadence of the East coinciding with the principal achievements of the West. In decline, each people creates a cultural void into which the forces of the rival -- and rising -- civilization must tend to flow. The consecutive phases of expansion assume a military form — the conquest of one nation by another nation. We are at first inclined to see these conquests as the overspilling of energy, the exuberance of an achievement which can no longer be kept within the original frontier. The swellings of power do undoubtedly occur; but further study may induce us to think that the vacuum is a more powerful force than the force of conquest.

Reordered Grammatical Version (RG), paragraphs 4-5

In its decay, each civilization creates a cultural vacuum into which the forces of the rival -- and rising -- civilization must tend to flow. And this creates the vacuum into which another and more virile civilization is drawn. These alternate phases assume a military form

-- the conquest of one nation by another. We are at first inclined to see these conquests as the overspilling of energy, the exuberance of an achievement which can no longer be kept within its original frontier. Such events do undoubtedly occur; but further study may incline us to think that the vacuum is the more powerful force.

In studying the history of relationships between East and West, we come to realize that there have been alternating phases of Oriental and Western ascendancy. For East and West, these periods have never been simultaneous. Instead, they have alternated, the decadence of one coinciding with the highest achievements of the other.

Reordered Lexical Version (RL), paragraph 4-5

In decline, each civilization creates a cultural vacuum into which the forces of the rival -- and rising -- civilization must tend to flow. And this decay creates the void into which another and more virile society is drawn. These alternate phases of expansion assume a military form -- the conquest of one nation by another nation. We are at first inclined to see these conquests as the overspilling of energy, the exuberance of an achievement which can no longer be kept within the original frontier. The swellings of power do undoubtedly occur; but further study may induce us to think that the vacuum is a more powerful force than the force of conquest.

In studying the history of relationships between East and West, we come to realize that there have been alternating phases of Oriental and Western ascendancy. For East and West, the times of thriving culture have never been simultaneous. Instead, there have been successive epochs of dominance, the decadence of the East coinciding with the principal achievements of the West.

In each of the grammatical versions, depending on the sequencing of the sentences, the demonstrative this refers to a different set of concepts. In the original version, this refers to the dying of energy, the sterility of the arts, and the timidity of policy. In the reordered version, this refers to "a cultural vacuum into which the forces of a rival civilization must flow." Other features of cohesion are pronouns, ellipsis, and verb substitution (e.g., "does").

This change in relations also holds true in the lexical versions. In addition, the demonstrative this is accompanied by the word "decay." Synonyms used for "decay" are "decline" and "decadence." Other synonyms used are "void" and "vacuity" for "vacuum," "society" and "nation" for "civilization," "successive" for "alternating," "times of thriving culture" and "epochs of dominance" for "ascendancy." The phrase "the conquest of one nation by another nation" later appears as the general words "these vast movements of mankind."

In the original version, these sentences, interspersed with others, form an introduction describing the situation, questioning the cause of the final result, and answering or explaining the process. In the reordered version, however, these general comments also serve as examples (see Appendix C, Table 10, "Discourse Analysis -- Test 6).

The different location of the sentences and the shift in emphasis resulted in different sentence functions and illocutionary acts. It was assumed that these changes would affect the ease or difficulty of information processing and that these differences would be reflected in different mean test scores for the two test versions.

### d) Coherence and Items of Cohesion

The use of cohesive items can also affect the reader's interpretation of the organization and relations of concepts in the text. Grammatical markers such as "it" or "this" may need to be correctly interpreted to enable the reader to follow the writer's argument successfully. Similarly, synonymous words (items of lexical cohesion) may need to be recognized as such (e.g., "the overspilling of energy" = "the swellings of power" = "the overflow") for the reader to understand the text. The extent to which such features of cohesion affected the statistical results was examined.

### c. Discourse Analysis

Discourse analysis of the rhetorical organization of "coherence" of a text was carried out to reveal patterns which could be linked to reading ease or difficulty. Sentence functions were labeled according to lists of sentence types suggested by Horn (1971), Jones and Faulkner (1971), and Larson (1967). The illocutionary force of paragraphs was determined according to lists by Austin (1962), Wilkins (1976), and Munby (1978). The sentence functions, paragraph-level illocutionary acts, and paragraph-level concepts in the texts were examined and compared with the M-C questions on the texts to determine whether any particular rhetorical pattern or order was more difficult than any other.

### 1) Discourse Analysis of Sentence Functions and Paragraph Functions

In this study, the term "illocutionary force" was used to describe the macro-level function of a paragraph, whereas the term "sentence function" was restricted to the micro-(sentence) level. The patterns that form sentences and paragraphs in each text version were examined to determine whether some discourse patterns (e.g., contrast, explanation) might be easier or more difficult than others (e.g., example, description). This method measures the effect of coherence (the organization and relations between concepts in the text) rather than cohesion.

It was assumed that texts whose ideas are complex, or which contain a good deal of contrasting or shifting arguments, are more difficult than texts containing only one argument which includes many examples, explanations, and/or descriptions. (See Chapter 2, B.1.b.6), pp 30-31.)

### 2) Paragraph-Level Concepts

An analysis of the concepts and structure of each sentence was carried out to discover the general conceptual shape of each paragraph and of the text as a whole. A diagrammatical breakdown of the texts -- according to the functions and concepts in each sentence and paragraph -- appears in Appendix C, Tables 5-10, "Discourse Analysis and Sentence Function."
(See Chapter 2, C.2.b.2) c), pp 68-71.)

## C. DATA PROCESSING AND ANALYSIS

### 1. Flesch Reading Ease Readability Formula

The formula was applied to the first 100 words of each of the text versions (see Appendix C, Table 1, "Texts Ranked According to the Flesch Reading Ease Formula"). The resulting scores were placed in increasing order to form a hierarchy of difficulty. Scores were examined for differences in difficulty between the original and reordered versions, and between the grammatical and lexical text versions. In this study, the former two would indicate differences in coherence and the latter two differences in cohesion.

### 2. M-C Test Results

#### a. Item Analysis: Easiness Indices, Mean Scores, Reliability

This study used the ITANA V computer program of Item Analysis developed by Nevo et al. (1975) and Ramraz (1979) to analyze results of M-C questions. This program provides information on each question as well as on the test as a whole. It provides mean scores, standard deviations, and reliability of the test based on the Kuder-Richardson Formula #20 and the Split- Half Formula. (See Appendix C, Table 15, "Results of M-C Comprehension Tests 1-4 -- Cohesion"; Tables 27-32, "Easiness Indices -- Tests 1-6.")

Especially useful in this research was the Easiness Index (also known as Facility Index and Difficulty Index), which represents the number and percent of correct answers for each question for the total test population. Using t-test analysis, this study compared differences between the Easiness Indices of the identical questions in the grammatical and lexical versions. (See Appendix C, Table 14, "Hierarchy of Easiness Indices of Questions Related to Sections of Text Containing Cohesive Items.")

### b. Comparison of Student Responses

For Tests 1-4, scores of doctored versions of tests were compared with those of the original versions as well as with each other. For the 24 doctored versions of the six original texts, t-tests and F-tests (Two-way ANOVA of score by year by test type) were used to calculate whether there were any significant differences among mean test scores, among Easiness Indices of questions, and among responses to specific questions directly dealing with sections of doctored texts. (See Appendix C, Table 18, "Results of M-C Questions on Texts Doctored for Grammatical and Lexical Cohesion;" Table 19, "Coherence -- Results of M-C Questions on Original and Reordered Versions of Text;" Table 26, "M-C Questions with Significant Differences.")

### 3. Cloze Test Results

Student responses on the cloze procedure were marked by the researcher as follows: correct answer = 2, partially correct answer (showing some comprehension) = 1, wrong answer or no answer = 0. The percent of correct answers, mean test scores, and standard deviations were calculated for each text version. Partial credit was given to words that were not wild guesses and that would make some sense in context, even though they were not semantically close to the original word (see Appendix C, Table 16, "Cloze Findings").

### 4. Discourse Analysis

#### a. Frequency of Cohesive Items in Texts

The frequency and percentage of items of lexical and grammatical cohesion in relation to the whole text were calculated for each of the 24 doctored text versions. (See Appendix C, Tables 2 and 3, "Items of Grammatical and Lexical Cohesion in Original and Reordered Texts.")

#### b. Illocutionary Force, Sentence Functions, and Paragraph-Level Concepts

Tables indicating the illocutionary force, sentence functions, and paragraph-level concepts of each of the sentences in the texts were prepared. In this way it way it was possible to follow differences in the patterns of logical sequencing between original and reordered text versions. (See Appendix C, Tables 5-10, "Discourse Analysis.")

### c. Matching Multiple-Choice Easiness Indices and Discourse Analysis

For Tests 1-4, charts of cohesive items were prepared across the three text versions (i.e., the original and two "doctored" versions). (See Appendix C, Tables 11-13, "Cohesive Chains: Graphic Chart of Cohesive Items Across 3 Versions of Texts, Comparison of Results of Test Questions;" Tables 20-25, "Matching Test Questions with Lexical and Grammatical Items of Cohesion in Text: Tests 1-6.") In this way it was possible to compare differences in text that were caused by doctoring with student responses.

Easiness Indices were also included in the table of sentence functions and illocutionary force so that comparisons between text structure and student responses could be made (see Appendix C, Tables 11-13, "Cohesive Chains"). Relations were sought between specific patterns of argumentation in the text and the difficulty or ease of the questions corresponding to those sections of text (see Appendix C, Table 17, "Additive vs. Contrastive Paragraphs").

## D. SUMMARY

One purpose of this study was to determine whether advanced EFL students' difficulty in reading English texts was affected by cohesion and coherence. The researcher assumed that it was possible to doctor a text so that their cumulative effect could be measured. It was also assumed that features of cohesion and coherence would affect students' ability to answer comprehension questions on a text. Another assumption was that some features of cohesion and coherence would cause more reading difficulty than others. It was hoped that differences in test results would be statistically significant either on the macro- (whole-text) or the micro- (word and sentence) level, or both.

### 1. Cohesion

Six texts were doctored for both lexical and grammatical cohesion. The Flesch Reading Ease Readability Formula was applied to each text version. Comparisons were made between student responses to M-C questions and the doctoring of texts. For the M-C tests, t-tests and F-tests (two-way ANOVA of score by year by test type) were used to calculate whether there were any significant differences among mean test scores, among Easiness Indices of questions, and among responses to specific questions directly dealing with sections of doctored texts. These results were compared with oral interviews of students who had taken the M-C tests and with discourse analysis of the texts.

## 2. Coherence

The six texts were reordered. Again the Flesch Reading Ease Readability Formula was applied to each text version. For each text, discourse analysis techniques were used to reveal patterns of text organization: rhetorical sentence function (illocutionary force) and paragraph-level concepts were tabulated. Again, tests were administered and comparisons made between the researcher's description of the text content and structure, on the one hand, and the difficulty or ease of reading comprehension, as reflected by student test scores (M-C and rational cloze), on the other.

## NOTES TO CHAPTER THREE

1. This assumption, however, was not necessarily always true. Although on the whole the tests were reliable, there were some multiple-choice test questions that were problematic, either because of unintentional ambiguity, or because for some students either the text or the questions, or both, were too difficult. These problematic questions could be identified because either too many of the students (more than 90%) or too few (less than 30%) were able to answer them correctly, and/or because of the low Discrimination Index (point-biserial correlation between the student response and the total raw test scores). Questions with a Discrimination Index below .30 did not discriminate between better students (those receiving high scores on the test as a whole) and poorer students (those with low total test scores). Nevertheless, it was decided to use these M-C questions if a team of teachers agreed that they were fair, especially since some of the questions had low Discrimination Indices in one test version but had acceptable (or even high) Discrimination Indices on a parallel test version. It was hoped that any isolated defective questions would not significantly damage the test design as a whole.

2. The difficulty of finding significant differences in test scores has already been discussed by Baten (1981). In previous research on text difficulty, Sim (1979) was able to find that the presence of certain items of cohesion in a text made it significantly more difficult for advanced

EFL students to read. He argued that students who misunderstood these words had more difficulty than if the words had never appeared. For these students, rather than being signals, the markers served as obstacles to comprehension. However, Fishman (1978) and Baten (1981), also working with text cohesion, were not able to find significant differences in test scores.

3. For their helpful comments and criticism, I wish to thank Ilana Bousso, Lillian Groebel, Dr. Melvin Kornfeld, Batia Laufer, Leslie Levanon, Stella Levy, Joyce Livingstone, Marion Lupu, Feigy Rosenfeld, Betty Rozen, Dr. Donald Sim, and Miriam Widman, Dept. of Foreign Languages, Haifa University.

4. In 1980 students took both the experimental mid-year and final examinations in January and June. Thus the same students took one of the first set (Test 1-4) and also one of the second set of tests (Tests 5 and 6).

5. Although as one of the teachers in the Department of Foreign Languages I could choose the texts for my own students, this number of students (approximately 50 per year) was too small to make much difference in the total test results.

6. See Baruch Nevo (1977) "Statistics in Student Admissions," Report No. 26; Esther Oren (1980) "Candidates to Haifa University 1974-1979," Report No. 49; Anat Yudfat (1980) "First-year University Students at Haifa

University: 1978-1980," Report No. 50; Haifa University Selection and Assessment Unit, Haifa University. These reports indicated no significant variation in calibre of students admitted to Haifa University from 1974 to 1980. It is assumed that this state of affairs continued until 1982, when the testing for this study ended.

5. This formula is cited by Klare (1963) as "being the one most often used and the one on which the most research data are available" (pp. 23 and 58-59).

8. Another consideration was that the results of this study could be compared with those of a previous study on cohesion that was carried out on the same population by Sim (1979). Research by Fishman (1978) and Baten (1981) also relied on results from multiple-choice tests.

9. In the original versions of the texts, blanks were selected approximately 7-9 words apart wherever possible. In the reordered versions, the same blank spaces appeared. Consequently, the number of words between spaces that occurred across sentences was irregular. Blanks within sentences, however, were not affected by the reordering process.

10. Valuable comments on the writing of the texts were made by Prof. E.A. Levenston, Dept. of English, The Hebrew University of Jerusalem, as well as by Dr. Shoshana Blum-Kulka, Prof. Andrew Cohen, and the students participating in their seminar on Research Methods in Applied Linguistics at the Hebrew University.

# CHAPTER FOUR

# COHERENCE

## A. DISCOURSE PROCESSING

This chapter deals with the sequencing and reordering of sentences in a text. It would be useful at this point to recapitulate the theoretical questions that underlie this study. The research question dealing with coherence was whether the reorganization of information in a text would affect reading comprehension for our EFL students. In the literature, the distinction is made between meanings and their surface forms or manifestations in sentences (Brown 1976, Wilkins 1976). Hence different texts may be written to represent alternative versions of a discourse (see Schnotz 1983 and Chapter Two, B.1.b., Meanings Encoded as Text, pp. 25-27). Possibly these texts differ in reading difficulty. If this is true, readers are obliged to deal with both the ideas themselves and the way they are organized in a text.

In the literature there are two distinct opinions about discourse processing (see Chapter Two, C.2.b.1)b), Order of Information: Sequencing of Propositions (Given/New), pp. 62-68). One proposed by Thorndyke (1979), Kintsch (1977), Gutwinski (1976), and Strang (1972), among others, argues that readers naturally try to impose some meaningful interpretation on a series of given propositions, and even arrange the author's ideas into new patterns. Based on the concept of schemata, "the fundamental elements upon which all processing depends" (Rumelhart, 1980, p. 33), this reading theory would include both knowledge itself and information about how this knowledge is to be used (Rumelhart, 1980, p. 34). Examples of the kind of knowledge recognized are word semantics, logical inference rules, and story schemata (Spiro, Bruce, and Brewer, 1980, p. 8).

According to this view, readers are expected to interpret the text, reorganize ideas if necessary, and provide missing links according to their expectations of text structure. Difficulties in reading comprehension might occur because readers lack the skill to use the knowledge they have:

> This approach suggests the possibility that some unskilled reading may be the result of not knowing how to use and interweave knowledge, rather than of a lack of knowledge itself. (Spiro, Bruce, and Brewer, 1980, p. 8)

Another view, set forth by Meyer (1975), Widdowson (1978), Fishman (1978), Kieras (1978), van Dijk (1980), Beaugrande (1980), Baten (1981), and Schnotz (1983), among others, states that text readability is affected by the order in which information is received.

The suggestion that both processes occur together has been proposed by Adams (1980), Spiro (1980), and Auble and Franks (1983). Comprehension is seen as the interaction between top-down processing from activated schema and bottom-up processing from concepts expressed by the sentence (Auble and Franks 1983). A top-down text (main idea first, then less important ideas) appears to be easier to recall than one that is bottom-up (least important ideas first) (Meyer 1975 and Kieras 1978). The number of reorganizations necessary to process information may also contribute to reading difficulty (Baten 1981, p. 17).

The concept of top-down/bottom-up text structure is also applied to the reading process as described by Adams (1980):

> For the skilled reader, top-down and bottom-up processing are occurring at all levels of analysis simultaneously as she or he proceeds through the text. The reader is therefore able to make optimal use of the information on the page, the redundancy of the language, and the contextual environment with minimal effort. The top-down processes ensure that lower order information that is consistent with the reader's expectations will be easily assimilated, as it will already have been partially processed. Meanwhile, the bottom-up processes ensure that the reader will be alerted to any information that is novel or that does not fit her or his ongoing hypotheses about the content of the text. (p. 12)

It has been found that truly fluent readers are able to infer the complete message in a text, even when not explicitly stated (i.e., inferring a full clause from a single adjective, reorganizing information, etc.). The not-so-fluent readers, however, are not able to do so (Meyer 1975 and Glock 1978-79). Another study by Meyer, Brandt, and Bluth (1980) found that good readers are able to process top-level structure of text, whereas the others are not.

One problem with this kind of research is that even though changed word order might make a text more difficult to process, this difficulty might still not affect performance on comprehension questions (Baten 1981) or would not quantitatively affect recall severely enough to be detected

(Beaugrande 1980). We did not know, therefore, at the start of our research, whether quantitative, measurable differences in difficulty would be elicited by our research methods.

## B. REORDERING AND DIFFICULTY

### 1. Original vs. Reordered Texts

The sentences in six texts were reordered so that the texts still made sense but were structured differently. Except for a few unavoidable instances, none of the words in the texts was changed -- only their position in the text. There were two versions of each text: original and reordered. (See Appendix C, Table 4, "Key to Rearranged Sentences: Reordered Coherence.")

The difficulty of each of the text versions was measured by the Flesch Reading Ease Readability Formula (see Chapter Three, B.2.a., p. 3), the rational modified cloze procedure, and test results of multiple-choice (M-C) questions accompanying the texts.

#### a. Flesch Reading Ease Readability Formula

The Flesch Reading Ease Readability Formula was applied to the first 100 words of each text. Results of the formula for Texts 1-6 show no difference between original and reordered versions (chi-square test for goodness of fit: chi-square = .33, p = n.s. See Appendix C, Table 1, "Texts Ranked According to Flesch Reading Ease Formula").

### b. Rational Cloze Procedure

Words deleted by the researcher were those that could be reasonably guessed from the contextual clues. The same words were deleted for both original and reordered versions. The distances between deleted words varied, therefore, in each of the versions. The undoctored (original) versions of Texts 1-3 were used. The number of blanks for Texts 1, 2, and 3, was 46, 38, and 50, respectively. A total of 186 students were tested.

Test results showed that the reordered versions were significantly more difficult than the original versions ($F = 1.64$, $df = 97$ and $88$, $p<.05$; $t = 4.36$, $df = 184$, $p<.0001$, see Appendix C, Table 16, "Cloze Findings"). An examination of each text separately showed a significant difference for Texts 1 and 2 ($F = 3.00$, $df = 28$ and $33$, $p<.005$); and $t = 5.07$, $df = 55$, $p<.0001$, respectively[1]), but no significant difference for Text 3 was found. The last finding may be explained by the results of a two-way ANOVA, which showed a significant interaction effect between texts and coherence (see Table 16a). $F = 4.76$, $df = 2$, $p = .01$.

### c. M-C Tests

Two different test batteries were administered: Tests 1-4 as a mid-year exam after 50 hours of instruction, and Tests 5-6 as a more difficult final exam after 100 hours of instruction. Each test was accompanied by 20 M-C questions; there was a total of 120 questions for all six exams (see Appendix C, Tables 4a and 4b, "Parallel Questions").

A significant difference was found between (M-C) test scores of original and reordered versions of the six texts. A comparison of overall test results yielded the following results: $t = 2.37$, $df = 22$, $p<.05$. Comparing the separate questions in each test version, we also found significant results: $t = 3.31$, $df = 956$, $p<.001$; $F = 10.95$, $p<.001$. There was a significant difference between the Easiness Indices of the original and reordered versions for 38 questions (32% of the total 120 questions). (See Appendix C, Table 19, "Coherence -- Results of M-C Questions on Original and Reordered Versions of Texts," and Table 26, "M-C Questions With Significant Differences.")

T-tests were applied to the separate questions according to version (e.g., the results of Question 1, for example, in both the original and reordered versions, where this question may be called by another number, such as Question 9). It was found that for 38 questions (32%) of the total 120 questions (6 texts, 20 questions each), there was a significant difference between original and reordered text versions.

Of these 38 questions, F-tests showed that for 22 questions (58%), the reordered versions were harder, for 12 questions (32%) the original versions were harder, and for 4 questions (10%) the Easiness Indices were on the same level for both original and reordered versions. Of these 38 questions, only 12 were also found by t-tests to have significant differences between original and reordered versions. A total of 25 questions (21%) were found significantly different by t-tests: for 18 questions (72%) the reordered versions were harder, but for 7 questions (28%) the original versions were harder. Thus F-tests showed more questions to be significantly different in each version than did t-tests (see Appendix C, Table 26).

From the total 120 questions, those found significantly different were relatively few: the reordered versions were harder for 22 questions (19%) according to F-tests, and for 18 questions (15%) according to t-tests; the original versions were harder for 12 questions (10%) according to F-tests, and 7 questions (6%) according to t-tests.

It is assumed that many of the questions yielded significant results by chance. That is, they were found statistically significant by F- tests and/or t-tests by coincidence, as a result of the large number of question pairs, but not because of the questions themselves or the sections of text they accomapny. For this reason, these questions were not examined further. Nevertheless, these results on separate questions confirm the findings of the F-tests and t-tests for overall test results, namely, the reordered versons were generally found to be more difficult than the original.

### d. Effects of Reordering

It may be concluded from these results that the reordered versions were more difficult than the original versions of text. Therefore, for our EFL students, the sequencing of information has been shown to affect readability or reading difficulty.

Reordering the texts appeared to affect five aspects of discourse: cohesion, sentence functions, paragraph-level concets, illocutionary force, and top-down/bottom-up structure (see Chapter 2, B.1.b.6), pp 30-31 and C.2.b.2)c), pp 68-71; Appendix C, Tables 5-10, "Discourse Analysis"). It has been established that reordering sentences is a procedure that significantly affects text readability (i.e., affects Easiness Indices of M-C Test scores). At this point it was not clear whether the reordering procedure made the texts easier or harder to read. Now these five aspects were examined to determine how each one contributed to the total change during the reordering process.

### 2. Effects of Reordering on Text Cohesion

One way of looking at cohesion is to see it as not directly related to coherence (Widdowson 1978, Tierney and Mosenthal 1980 and 1981, Carrell 1982). That is, texts may be coherent without necessarily being cohesive, and vice versa. Another view of cohesion is that it may be one aspect of coherence (van Dijk 1977c, Baten 1981, Langleben 1981). During the course of this research study, we found it necessary to take into account the effect of cohesion on the reordering process (see Appendix C, Tables 2 and 3, "Items of Grammatical and Lexical Cohesion in Original and Reordered Texts" and Tables 20-25, "Matching Questions With Lexical and Grammatical Items of Cohesion in the Text").

The Easiness Indices of questions relating to sections of text that had been doctored were examined separately. The researcher investigated the interaction effect between questions relating to sections of text containing grammatical or lexical cohesion, on the one hand, and original or reordered sentences in the text, on the other (see Appendix C, Tables 27-32, "Easiness Indices: Tests 1-6"). F-tests (ANOVA) comparing the interaction effect between cohesion and coherence were not significant. A comparison of all six tests showed the F-value to be 1.96 (df = 47, p =

n.s.); looking at each of the components separately, we found the F- value for reordering to be 5.43 (df = 1, p<.05), the F-value for cohesion to be .31 (df = 1, p = n.s.), and the interaction F-value to be .09 (df = 1, p = n.s.). Examining each text separately, we found no significant effects. A two-way ANOVA confirmed these results, there was no interaction effect (see Table 19a).

Nevertheless, looking at Tables 20-25, "Matching Test Questions with Lexical and Grammatical Items of Cohesion in the Text," we see that the same questions include features of cohesion in the original version that may not appear in the reordered version, and vice versa. In other words, the reordering process has affected not only items of cohesion but their related questions as well. Thus, in the grammatical version of Text 1, Question 8 contained grammatical repetition in the original version; however, in the reordered version Question 8 contained reference instead of grammatical repetition. In the lexical version, Questions 2 and 7 were related to sections of text containing synonyms in the original version which changed to lexical repetition in the reordered version. Question 10 contained lexical repetition in the original version and a synonym in the reordered version. Hence in Text 1 the reordering process affected four of the twelve questions relating to sections of text containing cohesion. In Text 2 there were changes in all of the ten cohesion- related questions; in Text 3 in seven of the fourteen questions (nos. 1, 2, 7, 8, 12, 13, and 18); in Text 4 in six of the thirteen questions (nos. 1, 4, 7, 9, 11, 12); in Text 5 in thirteen of the sixteen questions (nos. 1- 5, 9-1, 13-16, and 18); and in Text 6 in sixteen of the eighteen questions (nos. 1-3, 5-13, 15-18).

Examining the total number of questions involved in cohesion for each version, we observed different patterns, depending on the texts. In Text 1 there was no real difference in the total number of questions for any version. For Text 2, original grammatical and lexical versions had the same number of questions. The reordered version of Text 2, however, contained fewer questions, and the numbers were different for grammatical and lexical versions. In Texts 3 and 4, there was the further complication that the doctoring procedure changed the text versions each year. For these texts the differences between question Easiness Indices resulting from the doctoring procedures appeared to be greater than the differences involved in features of cohesion. In Text 5, the original grammatical text had fewer questions relating to cohesion than any of the other versions. In Text 6, it was the original lexical version with the fewest number of questions relating to cohesion.

What is obvious from the results of t-tests and F-tests is that questions were affected by the changes in text. These differences in questions may reflect the doctoring procedure, in which features of cohesion were changed, or the reordering process, in which the order of the sentences was changed, or to both of these factors. The fact that significant results were obtained indicated that the M-C tests were sensitive to changes in discourse structure.

Let us examine the opening section of Text 2 and its related questions where such changes occurred. Appendix B contains all versions of Text 2. The sections pertinent to our argument will be presented here.

Text 2 -- original coherence, grammatical cohesion

World population growth -- and how to slow it -- continues to be a subject of great controversy. The world's poorest nations have yet to find effective ways to slow this growth -- at least without restricting citizens' rights and violating such traditions as the one of having large families as insurance in old age. Population growth is the gravest problem the world faces over the decades immediately ahead. In many ways it is an even more dangerous and subtle threat than war, since it is less amenable to organized control. It is not in the exclusive control of a few governments, but rather hundreds of millions of individual parents. It must be faced -- like the nuclear threat -- for what it is: a central determinant of mankind's future, one requiring far more attention than at present.

Text 2 -- original coherence, lexical cohesion

World population growth -- and how to slow it -- continues to be a subject of great controversy. The planet's poorest nations have yet to find effective ways to check this population increase -- at least without restricting citizens' rights and violating such traditions as the custom of having large families as insurance in old age. Population growth is the gravest issue the world faces over the decades immediately ahead. In many ways an increase in the earth's population is an even more dangerous and subtle threat than war, since a rise in the number of the world's inhabitants is less amenable to organized control. The problem is not in the exclusive control of a few governments, but rather in the hands of hundreds of millions of individual parents. The population threat must be faced -- like the nuclear threat — as a central determinant of mankind's future, a problem requiring far more attention than is presently given.

Text 2 -- reordered coherence, grammatical cohesion

Last year the world's population passed 4 billion. While the growth rate in the developed nations is actually slowing down, in the developing countries it is accelerating rapidly. It is the gravest problem the world faces over the decades immediately ahead. Unless there is a holocaust brought on by man or nature, it will continue. The problem, then, is to slow this down in the developing contries where fertility is high.

The world's poorest nations have yet to find effective ways to check this growth -- at least without restricting citizens' rights and violating such traditions as that of having large families as insurance in old age. A number of governments are moving in the direction of coercion.

Text 2 -- reordered coherence, lexical cohesion

Last year the world's population passed 4 billion. While the growth rate in the developed nations is actually slowing down, the rate in the developing countries is accelerating rapidly. Population growth is the gravest issue the planet faces over the decades immediately ahead. Unless there is a holocaust brought on by man or nature, the process will continue. The problem, then, is to control the population growth in the developing countries where fertility is high.

The globe's poorest nations have yet to find effective ways to check the population increase -- at least without restricting citizens' rights and violating such traditions as the custom of having large families as insurance in old age. A number of governments are moving in the direction of coercion.

Question 1 (original version) = Question 3 (reordered version)

According to these lines, the poorest countries

1. have found ways to slow down population growth
2. have not found ways to slow down population growth
3. don't want to find ways to slow down population growth
4. will soon find ways to slow down population growth

Examining what students are required to understand when answering this question, we see that in the grammatical version, they must interpret "have yet to find" to mean "have not yet found," and discover the anaphoric referent of "growth." In the original grammatical version, "this growth" (line 4) refers back to "it" and "world population growth (line 1). In the reordered grammatical version, however, the cohesive ties are much more indirect. From "this growth" (paragraph 2, line 11), readers must return via "this" (line 8), and "it" (lines 4 and 7 -- twice), to the referent, which is implied but not clearly stated: "the world's population" (line 1), "the growth rate . . . is actually slowing down" (lines 2 - 3).

The situation is slightly different in the lexical versions. In order to answer the M-C question, students must recognize the equivalence, in the original version, of "population increase" (line 4) and "population growth" (line 1). The features of cohesion involved are repetition of "population" and the synonyms "growth" and "increase." In the reordered version, the cohesive links between the two sentences are the same as in the original version, even though the sentences themselves are different. Again, "population increase" (line 12) refers back to "population growth" (lines 5, 9).

This example shows that when sentences were reordered, the markers of cohesion did not necessarily stay the same. There was no statistical evidence, however, that changes in cohesion affected the reading difficulty of the questions accompanying the reordered texts. This lack of significant difference does not clarify the relation between cohesion and coherence. It does, however, show that by reordering sentences one does more than change the order in which ideas are presented. One thereby also changes the cohesive links binding those sentences together. Thus the evidence in this study tends to confirm the approach that sees cohesion as an aspect of coherence.

## 3. Effects of Reordering on Discourse Patterns: Sentence Functions, Paragraph-Level Concepts, Illocutionary Force

### a. Discourse and Focus

The process of reordering the sentences affected the order in which information was presented. Changes occurred on the sentence and paragraph levels as well as on the whole-text level. The term "sentence function" will apply to the sentence level, and "illocutionary force" will relate to the paragraph and whole-text levels. Sentences were categorized according to the classification of logical relationships by Horn (1971). (See Tables 5-10, "Discourse Analysis.") On the sentence level, the reordering process sometimes altered the function of a sentence, which is determined not only by the sentence itself but also by the sentences preceding and following it. For example, Text 2, Sentence 6 consists of an answer in the original version and a contrast in the reordered version (see Appendix C, Table 6). Sentence 8 is a contrasting fact in the original version but a simple statement of fact in the reordered one. According to Table 6, Sentence 11 presents two separate results, functioning as a contrast in the original version but having the function of amplification and cause/effect in the reordered version.

On the paragraph level, content and illocutionary force are also altered. Often the illocutionary force is indirect, being inferred from the context without explicit cohesive markers. In the reordered version, the illocutionary force of each paragraph is different; beginning with the statement of the problem, it progresses directly to a discussion of the solution and its results, and it ends with a restatement of the problem.

The cumulative effects of these changes on the paragraph level are to change the focus on the general whole-text level. Whereas the original version ends on a positive note, giving a clear solution, the reordered version ends on a threatening note. The impact on the reader of the reordered version, although containing the same information, is different.

Only Text 3 has no change in focus between original and reordered versions. This stability is due to the fact that Text 3 contains a static description of a situation. The writer is not trying to persuade the reader of a point of view; the tone of the text is relatively neutral.

An examination of the endings of the other texts will reveal the differences in focus. In Text 1, both versions are hopeful. The original version ends on the note that physiological and psychological factors enable the elderly to keep themselves active, whereas the reordered version ends with the hope that help will come from scientific techniques (e.g., drugs and psychotherapy). In the original version of Text 4, the solution is important and appears near the end of the text. In the reordered version the solution is de-emphasized by being placed in the middle of the text, while the ending deals with a neutral identification of sources of money. In Text 5 it is an implied threat that is de-emphasized by being placed in the middle of the reordered version. The impact of the original version is negative, showing cause for dissatisfaction, whereas the reordered version neutrally presents an unequal situation. The original version of Text 6 is positive, dwelling on the development and progress resulting from the friction between cultures. The reordered version, however, ends with the implicit resentment of the subjugated peoples who live in a cultural vacuum.

In one case, during the testing, the reordering procedure resulted in a need for changing the correct answer. In the original version of Text 6, the correct answer for Question 19 was no. 4, whereas in the reordered version the correct answer was no. 2.

Question 19:

From a history of relationships between civlizations the writer concludes that

1. colonialism and imperialism are wicked and ought to be punished by revolution
2. all civilizations, without exception, must go through periods of origin, growth, achievement, and decay
3. the Oriental and Western civilizations will forever remain in conflict and will eventually decay
4. in order to avoid decadence, friction and the clash of contrasting ideas are absolutely essential

This change in correct answer was due to the change in focus between the two versions. The mean Easiness Index for Question 19 in the original version was 37% and in the reordered version 31%. It was a difficult question in each version.

These changes in focus resulted from differences in paragraph- level and illocutionary force throughout the text. The end of the text, receiving the cumulative effect of the previous paragraphs, took on a special significance. The very position of certain sentences either at the beginning or end of a text caused them to take on a significance that they would not ordinarily have if they were placed somewhere in the middle of the text. Thus by shifting the focus, the reordering of sentences, to a certain degree, also affects illocutionary force and concepts in the text.

### b. Additive vs. Contrastive Paragraphs

Among the different types of sentences and paragraphs, the researcher paid special attention to those whose functions were additive or contrastive. In additive paragraphs, an idea is explained and examples given to argue a certain point of view or describe a given situation. In conrastive or comparative paragraphs, alternative points of view are expressed, comparisons are made between objects, or there may be reservations or disagreement.

According to the literature, connectives in general may be a source of difficulty (Cohen et al. 1979, Sim 1979, Baten 1981). One reason may be cultural. Kaplan (1966) found that in Arabic almost all the ideas are coordinatively linked with little subordination, whereas in English far more subordination is part of the convention of expository writing. This phenomenon may cause connectives to be especially problematic for those of our students who are native speakers of Arabic. Another reason may be that it is more difficult to process discourse that contains shifts, nuances, contradictions, and reservations than it is to process straightforward ideas that are amplified. Additives could be considered the simplest connectives. Sim (1979) found contrastive function words more difficult than causal and conclusive function words (p. 187).

Assuming that a single, continuous line of thought would be easier to read than a sequence of sentences containing contrasts, the researcher examined questions touching on changes in such sections of text. For 13 of the 120 questions (11%), a change in the type of sentence function occurred during the reordering process (see Appendix C, Table 17, "Additive vs. Contrastive Paragraphs"). This change of function was not intentional on the part of the researcher. It was a by-product of finding another, alternative order in which to place the sentences so that they would still make sense.

Sometimes when additive sentences in the original version were reordered, they became part of contrastive paragraphs in the reordered version, and other times contrastive sentences and paragraphs in the original became additive in the reordered. In other words, neither additive nore contrastive paragraphs were particular to either the original or reordered version. Although this phenomenon did not explain why the reordered versions were generally more difficult, nevertheless it was worth examining. This by-product of the reordering process yielded an opportunity to compare the effects of sentence function on reading difficulty.

Those questions that involved sentences whose functions did not change from additive to contrastive, or vice versa, after the reordering process, were not examined, since these would not affect the comparison between the original and reordered versions. The Easiness Indices for only those 11% of questions involving a change in sentence function were compared by means of a t-test. Since there was no particular plan to place specific types of sentence function in any one version, both additive and contrastive paragraphs appeared in both original and reordered versions. The spread was uneven: of the thirteen questions found to touch on those sections of text where sentence function changed, nine were additive in the original version and contrastive in the reordered, and four were additive in the original version and contrastive in the original. That is, there were five more contrastive paragraphs in the reordered versions than in the original. Moreover, this phenomenon did not occur in all six texts: for Texts 1 and 2, reordering did not change illocutionary force. Additive and contrastive paragraphs stayed the same, regardless of text version.

Possibly, this difference between contrastive and additive paragraphs may be reflected by the results of t-tests and F-tests (see Appendix C, Table 19, "Coherence -- Results of M-C Questions on Original and Reordered Versions of Text"). The results of Tests 1-6 were broken down into mid-year exams (Tests 1-4) and final exams (Tests 5-6). For Tests 1-4, no significant difference was found between the original and reordered versions. For Tests 5-6, however, results of both t-tests and F-tests were significant ($t = 2.37$, $df = 515$, $p<.05$; $F = 4.70$, $df = 516$, $p<.05$).

Comparing thirteen pairs of questions, regardless of text version, the researcher found a significant difference between Easiness Indices of questions related to contrastive paragraphs and those related to additive paragraphs. The additive paragraphs were easier ($t = 2.28$, $df = 12$, $p<.05$). These findings are in line with theories by Kintsch et al. (1975), Kintsch and Vipond (1977), Kieras (1977), Fishman (1978), Sim (1979), and Baten (1981) that texts or paragraphs containing repetition or restatement of the same main ideas or an addition to an initial chunk of information are easier to read than texts or paragraphs including many different ideas or propositions.

There are three limitations to this finding. First, 11% of the questions is a very small number and indicates a marginal effect. Secondly, this effect does not necessarily point to the difference between the original and reordered versions -- only to a clearly distinct phenomenon involving additive and contrastive illocutionary force. The fact that there were five more occurrences of contrastive paragraphs in the reordered versions than there were in the original version does not necessarily explain the reason why the reordered versions were more difficult. Thirdly, this finding measures the text only indirectly; it is based on questions related to stretches of text. In fact, more of these changes occurred in the text (see Tables 5-10), but were not indicated for lack of suitable questions. Thus the method of using Easiness Indices does not faithfully represent the frequency or extent of the changes. It does, however, indicate trends and permits us to measure their effects on text difficulty.

The following examples from the texts may help illustrate what happened in the reordering process. (Only the versions of grammatical cohesion will be shown; the same phenomenon holds true for the lexical versions also.)

Text 6, original version, paragraph 1

> In studying the history of relationships between East and West, we come to realize that there have been alternating phases of Oriental and Western ascendancy. Periods of high cultural development have lasted from one to two thousand years (more or less), and scholars

> can break down these periods into: origin, growth, achievement, and decay. And whatever the height or splendor of their flowering, all civilizations known to us have ended in a decline.

Text 6, reordered version, paragraph 5

> In studying the history of relationships between East and West, we come to realize that there have been alternating phases of Oriental and Western ascendancy. For East and West, these periods have never been simultaneous. Instead, they have alternated, the decadence of one coinciding with the highest achievements of the other.

Question 1 (original version) = Question 14 (reordered version)

In these lines, the writer states that

1. there has always been conflict between East and West
2. phases of Oriental decadence have coincided with Western ascendancy
3. civilizations in the East and West have developed during the same period
4. although Oriental civilizations have flourished and decayed, Western civilization is still at its height

The original version is smooth. It begins with a general statement that is amplified and followed to a result. A contrast is also implied between the end of a civilization and its period of height. The answer to Question 1 is no. 2 which focuses on the "alternative phases" between East and West. This fact is presented as an interesting point and a neutral opening.

In the reordered version of Text 6, paragraph 5 begins with the original first sentence which exemplifies the preceding text. Its function here is to conclude an argument, not to initiate one. Moreover, while amplifying the first sentence, each of the other two sentences in paragraph 5 contrasts with the previous one. It is not a smooth paragraph. The phases are "alternating" not "simultaneous;" "instead" one coincides with the other. In the original version, the mean Easiness Index of Question 1 was 67%; in the reordered version it is 50% (new Question 14). The contrastive paragraph was more difficult than the additive.

Another example is the first paragraph of Text 5. (This time the versions of lexical cohesion will be used.)

Text 5, original version, paragraph 1

> When economic growth slows down, the process that is happening now, we will finally have to face the problem that the myth of a one-class society has obscured -- the problem of what to do about the working class, not to mention the poor, who have the temerity to ask for "more," and to be discontented even after getting more. This is an attitude that the middle and upper classes celebrate in themselves, but deplore in other groups. It is, however, an attitude that can be tolerated as long as everyone gets more, because growth benefits all classes.

Text 5, reordered version, paragraph 1

> Although social and political differences are very great throughout the Western world, income structures are much alike. The top 5 percent get only 15 percent of all income. The lower class is condemned to live on 5 percent of the nation's income. Moreover, there is the problem of what to do about the working class, not to mention the poor, who have the temerity to ask for "more," and to be discontented even after getting more. The working class, for this reason, must come into conflict with the middle class. Of course, the proletariat will also struggle against the upper class and the rich. And the bottom 20 percent of the population, the group with virtually everything to gain and almost nothing to lose, will be fighting against both the upper third of the country and the working class. The struggle of the lower classes is an attitude that the middle and upper classes can tolerate as long as everyone gets more, because growth benefits all classes. This is an attitude that the richer classes celebrate in themselves, but deplore in other groups.

Question 1 (original version) = Question 4 (reordered version)

The problem of the working class and the poor is caused by

1. an increase in economic growth
2. a decrease in economic growth
3. the myth of the one-class society
4. the surplus income of the rich

Again, for these paragraphs, the original version is smoother than the reordered one. It also contains fewer examples/facts. The first paragraph in the original version of Text 5 contains two contrasts: 1) the working class and poor vs. the middle and upper classes, and 2) the attitude that is tolerated during periods of growth but not during periods of economic decline. The first paragraph of the reordered version contains the same sentences in addition to six new ones. These sentences add contrasting facts so that each sentence contrasts with the previous one. In the original version the mean Easiness Index for Question 1 was 71%; in the reordered version it was 50%. Apparently, the numerous contrasting facts obscured, at least in part, the main point of the paragraph, which is response no. 2.

### 4. Top-Down vs. Bottom-Up Paragraphs

It has been shown that text recall is affected by paragraph structure (Meyer 1975, Kieras 1978). The easiest structure to recall appears to be top-down structure, where the first sentence gives the most important ideas, and subsequent sentences contain less important ones. When the secondary ideas begin a text (bottom-up structure), the text was found harder to follow and to recall. On the sentence level, superordinate clauses were found easier to recall than subordinate clauses (Bever 1972, d'Arcais 1978, Kieras 1978, Bever and Townsend 1979, and Baten 1981).

Researching the reading process of high school native English speakers, Meyer, Brandt, and Bluth (1980) found that good readers have no trouble in following top-level rhetorical structure, (e.g., problem/solution, comparison, antecedent/consequent, description, and collection (including sequence)), but weaker readers cannot do so without help. Thus, to facilitate reading, it is preferable that the important

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ideas appear first. Language problems on the micro-evel, however, may prevent EFL learners from deriving macro-structures (Widdowson, 1980, p. 242).

This terminology in describing text structure is paralleled in our analysis of the reading process. Reading comprehension is seen as the interaction between top-down and bottom-up processing by Auble and Franks (1983). Readers may be assumed to simultaneously perceive and relate to general ideas in a text (top-down) and particular details (bottom-up). Moreover, inefficient processing of either kind may impede reading comprehension (Spiro 1980):

> individuals may be able to execute the various processes of comprehension under some set of ideal conditions, but have difficulty under the real-time constraints of reading in natural settings because some of the processes are not executed efficiently. ... inefficient top-down processing can, in principle, contribute as much to reading deficiency as inefficiencies in word identification. (p. 265)

Although these studies were carried out on native speakers of English (except for the study by Widdowson, they also have applications for our EFL students. The results of the present research study may direct us to inquire whether, for EFL students, top-down text structure may not be easier to process than bottom-up text structure. A text which has top-down structure may give the reader an immediate framework. Otherwise, the reader may need to make the additional effort of deriving the framework (macro-structures) from the micro-structures in a bottom-up text. Whereas good readers may do this automatically, poor readers may not be able to arrive at the macro-structures without additional help.

A sample of the first paragraphs of each of the six texts was examined for top-down/ bottom-up structure. For Texts 1, 2, 5, and 6, the original version began with top-down structure, whereas the reordered version of these texts began with bottom-up structure. (For Text 3, both versions began bottom-up, and for Text 4, both versions began top-down. Consequently, these texts were considered separately.)[2] T-tests were applied to the Easiness Indices of the nine questions pertaining to the first paragraphs of original and reordered versions. For Texts 1, 2, 5, and 6, the original version contained the top-down structure, and the reordered version carried the bottom-up structure. A significant difference was found between top-down and bottom-up beginnings (t = 2.72, df = 8, $p<.05$).

To illustrate this point, the first paragraph of Text 1 is quoted below. The beginnings of Texts 2, 5, and 6 have already been quoted above -- see section 2., pp. 139-140, for Text 2 and section 3.b., pp. 149- 152 for Texts 5 and 6.

### a. Original vs. Reordered Versions

For Tests 1, 2, 5, and 6, then, there were significant differences between the Easiness Indices of questions relating to the first paragraphs of the original and reordered versions. Below are the original and reordered versions of the first paragraph of the grammatical version of Text 1:

Text 1, original grammatical version

> For all of medicine's skills, old age is as inevitable now as it was 2,000 years ago. The most conscientious exercises, careful diet and cautious life style cannot halt the gradual hardening of the arteries, the reduced output of critical hormones, the death of brain cells. These holding actions, including face-lifts and skin treatments, are ultimately futile. They do not stop the stiffening of tissue that causes wrinkling; they only disguise it.

Text 1, reordered grammatical version

> As models of fitness in old age, researchers like to point to the inhabitants of the Abkhazia region of

> Soviet Georgia. Many of these mountain people are still active, working their gardens, riding horseback, bathing in icy streams, well into their 80's -- and not because they only like natural foods. Dr. Aleander Leaf, who spent time with them, attributes their vigor to diet (low fat, high protein, fewer calories), exercise and the right genes. As Author-Physician Leopold Bellack points out: "Some people who are chronologically 80 are biologically only 60. Their bones, eyes, ears, skin -- even reflexes and blood pressure -- may be those one expects in a 60-year-old."

In the original version, the first paragraph of Text 1 begins with a general statement of the problem of the inevitability of old age which is amplified and described in the remaining two sentences of the paragraph. The entire paragraph is a general description without specific details or examples. In the first paragraph of the reordered version, none of the sentences of the original first paragraph appears. The paragraph begins with an example of the remarkable activity of certain elderly people, which is amplified by more detail in the two following sentences. The final two sentences give additional details, and the point is made that the physical appearance of the edlerly can be relatively youthful, given the proper conditions.

The content and emphasis of each of these initial paragraphs is slightly different even though the subject is the same. Their structures, however, are very different. The original version contains statements of top-level structure, whereas the reordered version presents details and information without stating the general assumption on which they are based. It is up to the reader to infer the general assumption that under certain conditions old people look and act younger than they are (see Appendix C, Table 5).

The original version of Text 2 (see above 2., pp. 139-140) also begins with a general statement of the problem which is amplified. The writer then presents his opinion that population growth is a world threat. The same idea is restated five times in the first six sentences. The first paragraph of the reordered version begins with a neutral fact. It is followed by another fact, and then the writer's opinion of the threat of poopulation growth, the same as appeared in the original version. This point is followed by the foreseen result, and the paragraph concludes with the formulation of the problem.

In the first paragraph of the original version, the top-level idea (i.e., the statement of the problem) comes first; in the reordered version it appears last (see Table 6). Furthermore, three of the sentences from the first original paragraph appear in the last paragraph of the reordered version. Coming at the end of the text, these three sentences, which contain the key top-level concepts, weight the whole text so that it is bottom-up rather than top-down. The effect, then, is not limited to only the first paragraph. (For the entire texts, see Appendix B.)

The first paragraph of the original version of Text 5 (see above 3.b., p. 151) begins with a general statement, followed by some opinions about it with a contrasting comment by the writer. It presents the problem. The reordered version begins with a qualified fact which is followed by two more facts. There follows half a sentence that also appears in the first paragraph of the original version and then three facts/results. The paragraph ends with the two sentences that were included in the original. Thus most of the original version appears in the reordered paragraph. The intervening sentences, however, emphasize the details rather than the problem itself. Thus the reordered first paragraph includes proportionately more bottom-level structure than the original (see Table 9).

The first paragraph of the original version of Text 6 is a very general overview of the process of civilization. The first paragraph of the reordered version, however, argues that conflict is the cause of progress. None of the sentences of the original version appears in the reordered one. These paragraphs have already been discussed above (3.b., pp. 149-153) where the structure of the original paragraph was considered to be additive and the reordered paragraph to be contrastive. It is hard to say whether the difficulty of the reordered Question 14 was due to the contrastive structure of the reordered paragraph or because the reordered version contained a larger number of less important ideas than the original (i.e., had bottom-up structure rather than top-down structure). Possibly, a combination of the two factors affected the M-C test question (see Table 10).

### b. Original and Reordered Versions

For Texts 3 and 4, on the other hand, there were no significant differences between Easiness Indices of original and reordered versions. One reason for this similarity may be that these texts have the same structure in both versions: Text 3 has bottom-up structure, and Text 4 has top-down structure in both original and reordered versions. The first paragraphs of Texts 3 and 4 are quoted and discussed below.

## Text 3 -- original coherence, grammatical cohesion

Because of the high social value attached to humor, people like to think that their perception of the comic is at least equal to that of others. They rarely admit that they do not understand a joke because they do not want to feel inferior in a quality that has such value. Instead, they pretend to understand it and laugh when everyone else does.

To distinguish between perception of the comic in oneself and in others, Gordon Allport has labeled the former "a sense of humor" and the latter "a sense of the comic." The former, therefore, is the ability to perceive oneself objectively and to be amused by one's inferiorities, jealousies and unsocial desires. It is, in short, the ability to laugh at oneself. The latter, according to Allport, is a "cruder" source of humor in which enjoyment is derived from the inferiorities of others -- which make him feel superior.

## Text 3 -- reordered coherence, grammatical cohesion

It is popularly believed that humor is a mark of intellectual superiority. There is no doubt that it is closely related to intelligence. Furthermore, much of the humor in jokes and even simple puns depends upon the person's comprehension of language -- which is closely related to intelligence.

As important as intelligence in the perception of the comic is a person's personality pattern. It is difficult to perceive humor in anything when one is worried or angry, for example. This means that such a person often has too many conflicts and anxieties to be able to enjoy the comic elements of a situation. Mood and emotional condition are central to his reaction. This is especially true in adolescence when, characteristically, a person is so sensitive to the opinions of others that he would hardly want to appear in a position of ridicule.

Both original and reordered versions of Text 3 are bottom-up. The general statements that begin each of the versions are not the main idea of the text. They are different secondary ideas. This structure is also evidenced by the fact that the sentences in the original first paragraph are not those which begin the reordered paragraph. These secondary ideas are amplified and exemplified in the first paragraph only. In the second paragraph, a new secondary idea is presented (see Table 7). In fact, the main idea is not explicitly stated in any single sentence in Text 3. The text presents a series of situations and examples containing different aspects of humor. There is a central theme but no single idea.

On the other hand, both original and reordered versions of Text 4 are top-down:

Text 4 -- original coherence, lexical cohesion

> All over the world, money and prestige go together. The more funds a person has, the more successful the person is judged to be. When living on an inherited income, whether the money supplements a salary or makes work unnecessary, the person is judged as coming from a successful family. "Old money" is thus a symbol of family prosperity; by contrast, "new money," or money earned by the person himself, is regarded as a symbol of personal achievement. In every culture, greater prestige is associated with old money than with new, and the person with old money is more favorably judged.

Text 4 -- reordered coherence, lexical cohesion

> Money contributes to two important ends: independence and social status. The more funds a person has, the more successful the person is judged to be. Since one of the bases for social judgment is the amount of money the individual has for status symbols and recreations, the more wealth a person has, other things being equal, the more favorably he will be judged by members of the group with which he is identified and the greater will be the chances of social acceptance and happiness. The success of an artist, for example, may be measured by the amount of work produced, and a scientist's career may be measured in the same way; but a musician's or a housewife's occupation may not be measured directly by the amount of work produced. Nevertheless, everyone uses money, and in general, greater means are required with each passing year.

Whereas the same idea (which is the main idea of the text) appears in both first paragraphs, the sentences through which the ideas are expressed, and the amplifications and exemplifications, are for the most part different. Only sentence 2 appears in both versions above. Moreover, three of the five sentences in the seventh paragraph of the reordered version are the same as the first paragraph of the original version:

Text 4 -- reordered coherence, lexical cohesion (seventh paragraph)

> Although the acquisition of money through inheritance is often disapproved, many people associate riches -- however acquired -- not only with social status, but also with happiness and security. When living on an inherited income, whether the money supplements a salary

> or makes work unnecessary, the person is judged as coming from a successful family. "Old money" is thus a symbol of personal success; by contrast, "new money," or money earned by the person himself, is regarded as a symbol of personal achievement. In every culture, greater prestige is associated with old money than with new, and the person with old money is more favorably judged. How much money a person needs to symbolize his success will vary, depending on age and group identification.

This last paragraph is bottom-up. It contains proportionately more examples and amplification sentences than main idea. Its content is a restatement of the main idea, however; thus the structure of the text is circular. The same can be said for the original version: the ninth paragraph restates the first main idea (see Table 8):

Text 4 -- original coherence, lexical cohesion (ninth paragraph)

> Since one of the bases for social judgment is the amount of money the individual has for status symbols and recreations, the more wealth a person has, other things being equal, the more favorably he will be judged by members of the group with which he is identified, and the greater will be the chances of social acceptance and happiness.

The main idea is restated in several sentences throughout the text, unlike Text 3 where there was no explicit statement of the main idea. Basically, Text 4 has one main idea which is repeated with different examples and is therefore recognized fairly easily.

In both Texts 3 and 4, reordering did not significantly affect the Easiness Indices of the accompanying questions. Part of the reason for this was probably the fact that in Text 3 there was no change in focus (see above 3.a., pp. 142-145). For Text 4, on the other hand, the main idea was restated so often that it was obvious to the students. Although the text was not easy, whatever difficulties the students may have had in comprehending it, finding the main idea was probably not one of those difficulties.

## C. SUMMARY AND CONCLUSION

The research question dealing with coherence was whether the reorganization of information in a text would affect reading comprehension for our EFL students. The sentences in six texts were reordered so that the texts still made sense but were structured differently. The difficulty of each of the text versions was measured by the Flesch Reading Ease Readability Formula, rational cloze procedure, and M-C Tests. T-tests and F-tests were applied to the Easiness Indices of test questions.

After finding that the reordered versions of four of the six texts were more difficult than the original, the researcher examined the possible reasons for these differences. Of the five aspects of discourse examined, top-down/bottom-up structure appeared most likely to have affected the reordering process. First paragraphs of the four texts where the original version was significantly easier showed top-down structure in the original version and bottom-up structure in the reordered version.

The effect of discourse patterns (i.e., additive vs. contrastive paragraphs) was less clear. Although the contrastive paragraphs were more difficult, there were only five more of them in the reordered than in the original versions. This proportion is hardly enough to account for the difference between the two test versions.

Cohesion, a factor we carefully doctored into the texts, apparently had no significant effect on the reordering process. And yet, it is clear that when sentences were reordered, cohesive ties were changed. Part of the reason for lack of statistical effect may have been the overlapping and contradictory effects of each of the features of cohesion separately, resulting in a blending of opposing focuses and a non-differentiated general picture.

In all of these conclusions, it must be kept in mind that our main instrument, the Easiness Indices of M-C questions accompanying doctored sections of text, may not have been fine enough to be attuned to any but the most obvious textual differences. The difference that we did find between original and reordered versions was not caused by any single factor, but probably by a combination of these three factors selected for examination: top-level structure, illocutionary force, and cohesion.

## NOTES TO CHAPTER FOUR

1. Note that for Test 1 the t-test was not significant, and for Test 2 the F-test was not significant.

2. Unfortunately, none of the texts examined original bottom-up structure and reordered top-down structure. Top-down structure is apparently more common. A replication of this study, however, should also include at least one text whose original discourse structure is bottom-up and whose reordered structure is top-down.

# COHESION

## A. A CAUSE OF DIFFICULTY IN READING COMPREHENSION

### 1. Text Cohesion and the Reading Process

In this study, the term "cohesion" refers to both grammatical anaphoric cohesion and lexical cohesion. Following a selected portion of the taxonomy of Halliday and Hasan (1976), we included these features of grammatical cohesion: pronouns (personal, demonstrative, and their repetition), substitution (nominal, verbal, and clausal), ellipsis, and exophoric reference; and these features of lexical cohesion: general words, superordinates, synonyms, and repetition. The number of items within a text of each of these features was increased to a maximum amount by the doctoring process in order to research the phenomenon of cohesion.

The classification of Halliday and Hasan (1976) contains grammatical reference, substitution, ellipsis, conjunctions, and lexical cohesion. Thus there is an implied distinction between grammatical and lexical cohesion. The present study is concerned with lexical cohesion and with grammatical reference, and ellipsis, excluding conjunctions. Conjunctions were excluded because we saw them as dealing with the element of logical relations — an area separate from the substitution of one word for another word, phrase, or clause, and beyond the scope of the present study.

Although Halliday and Hasan (1976) explain that there is no hard-and-fast separation between grammatical and lexical cohesion, for the purposes of this study texts were doctored separately and contained predominantly items of either one type of cohesion or the other. To obtain a representative sample of items of each feature, we included as many items as possible in the texts.

Since we were not certain whether, as a cause of difficulty, cohesion was basically one factor or two (grammatical and lexical), we began our study with the latter assumption and doctored our texts separately, so that both types of cohesion were taken into account.

A survey of the literature in the areas of recall and reading for native and non-native speakers of English indicated that the effect of cohesion in the reading process was a complex subject that might be expected to cause difficulty:

> I see several reasons for discussing anaphora here as an illustration of intersentential devices in reading comprehension. First, if a reader cannot handle an anaphoric expression as the writer intended, there is no way that he or she can correctly update his or her discourse model in response to it. Second, ... choosing between possible antecedents may demand very sophisticated syntactic, semantic, pragmatic, inferential, and evaluative abilities on the reader's part. ... One might suspect, therefore, that anaphora might easily be a source of comprehension difficulties. (Webber, 1980, p. 142)

Items of grammatical cohesion, anaphora, were indeed found to be good predictors of difficulty for native English speaking college students (Dutka 1978) and to cause difficulty in reading comprehension of weaker students of EFL (Sim 1979) and not-so-fluent native English speakers (Marshall and Glock 1978-79). Other researchers, however, found no direct connection between anaphora and reading difficulty for either students of EFL (Baten 1981) or for native English speakers (Meyer 1975, Fishman 1978). It was not clear whether their findings reflected a lack of relation or a shortcoming of the measuring devices used to evaluate this relation. Frederiksen (1981) found that, for native speakers, sentences containing reference required more reading time. Repetition was found to be a factor making texts easier (Flesch 1950, Kintsch et al. 1975).

The present study approached the problem of the relation between cohesion and reading difficulty from the point of view of the advanced EFL learner. A variety of measuring devices were used: Flesch Readability Formula, multiple-choice (M-C) comprehension questions, and modified rational cloze procedure.

## 2. Original vs. Doctored Texts

That text cohesion is one of the factors affecting reading comprehension is reasonably certain. Whether or not the misunderstanding of specific features of cohesion in a text is an obstacle so significant as to measurably hinder comprehension is another matter and is not easily proved. To answer this question the doctoring procedure was developed because the frequency of cohesive items needed to be increased in order to study the phenomenon of cohesion. Six texts were edited to include more items of cohesion than found in the original versions of those texts.

The following hypotheses were proposed: if the orignal texts were found easier than the texts doctored for cohesion, then the addition of extra markers of cohesion could be considered a factor causing difficulty. If the original texts were found to be on the same level of difficulty as the doctored texts, then cohesion could still be considered a factor causing difficulty but might not be singled out as a significant factor. If the original texts were harder than the doctored, then cohesion could not be considere as a difficulty-causing factor at all. On the contrary, markers of cohesion could then be seen as a factor reducing difficulty.

Difficulty of text versions was measured in two ways: by the Flesch Reading Ease Readability Formula and by test results of M-C questions accompanying the texts.

## 3. Findings

### a. Difficulty

#### 1) Flesch Reading Ease Readability Formula

Results of the Flesch Reading Ease Readability Formula (see Appendix C, Table 1, "Texts Ranked According to Flesch Reading Ease Formula) for Texts 1-4 show the difficulty level of the original versions to be within the same range as that of the versions doctored for both lexical and grammatical cohesion. (For the formula itself, see Chapter Two A.2., p. 3.) Separating the features of cohesion into the categories of grammatical and lexical (see Halliday and Hasan 1976), the researcher found that for

Texts 1, 2, and 3 the original versions were more difficult than the doctored for lexical cohesion. For Texts 2 and 4, the original versions were easier than the grammatical, and for Text 1 the original was on the same level as the grammatical version. For Text 3, the original was more difficult than both doctored versions: for Text 4, it was slightly easier than both doctored versions. Thus, judged by this formula, the versions doctored for grammatical and lexical cohesion were usually more difficult than the original texts, though there appear to be additional factors in the texts that affected the issue.

### 2) M-C Tests

Results of Tests 2-4, each accompanied by twenty M-C questions, differed from the Flesch Readability Formula. In general, the original version was found to be on the same level of difficulty as the doctored versions (see Appendix C, Table 15, "Results of M-C Comprehension Tests 1-4 -- Cohesion," and Tables 27-32, "Easiness Indices"). These findings were based on results of t-tests and F-tests (ANOVA) where test scores were compared according to type of cohesion and text. It must be remembered that the M-C questions themselves can be easy or difficult to read, and they may not necessarily be at the same level of difficulty as the text (see Bensoussan 1982). This thesis is based on the results of M-C questions. When examining the results, we must keep in mind that the questions measure text difficulty only indirectly. For a distribution of features of cohesion tested by each question, see Appendix C, Tables 20-25, "Matching Test Questions With Lexical and Grammatical Items of Cohesion in the Text."

### 3) Conclusions

The conclusion would be that although grammatical and/or lexical cohesion may not be greater obstacles to comprehension than other given elements in a text, they nevertheless contribute to reading difficulty. On the whole, the results based on grammatical and lexical cohesion could be said to be similar despite the fact that the Flesch Reading Ease Formula was based on the texts alone, whereas M-C tests used information from questions accompanying the texts. There was no clear-cut indication from either of the two methods that the original version could be considered as consistently differing in difficulty from the doctored versions. Conversely, for the most part, the doctored versions were at least as difficult as the original.

### b. Length

For five of the six texts, the grammatical versions had the fewest number of words -- from a minimum of 20 words fewer (Text 1) to a maximum of 85 words fewer (Text 5). In Text 4 the grammatical and lexical versions were of nearly the same length (see Appendix C, Tables 2 and 3, "Items of Grammatical and Lexical Cohesion in Original and Reordered Texts"). Thus the shorter, grammatical version, having the same content, was denser and more concentrated than the other versions. It was expected that this condensation of text would cause the grammatical version to be more difficult. This did not appear to be the case, however.

For five of the six texts the grammatical versions were harder than the lexical. According to the Flesch Formula (See Table 1), for Text 3 the lexical version was slightly more difficult. That is, the variety in vocabulary increased text difficulty. Although the lexical versions were generally longer, containing a greater number of words, the increased length of text did not appear to make the lexical versions more difficult than the grammatical versions.

In the four texts where the original version was analyzed, it was closer in length to the lexical version than to the grammatical for two of the texts (Texts 1 and 3) and closer to the grammatical version for Text 2. For every text the original version had a greater number of words than the grammatical version. Thus the grammatical version was also shorter and more concentrated than the original version.

Length of text did not appear to affect difficulty significantly, however. F-test (ANOVA) results of M-C test scores showed no significant differences between the longer lexical versions and the shorter grammatical ones. (See below B.1.b.2), M-C Tests, pp. 175-177, and Appendix C, Table 18, "Results of M-C Questions on Texts Doctored for Grammatical and Lexical Cohesion.") Hence any assumptions either that the shortest or the longest texts would be the most difficult were unfounded. No connection was found between length of text and difficulty.

This finding makes sense if one views a text or discourse as a series of propositions, not of words. In that case, the doctoring procedure affected only the wording of the propositions but not their number, their content, or the context of the propositions relative to each other. Therefore, the texts were not basically changed. If comprehension depends to a certain extent on the reader's deriving macro-structures from micro-structures (van Dijk 1978, 1980), then the actual wording of the micro-structures may be secondary to the concepts or propositions themselves. Kintsch and Vipond (1977), Fishman (1978), and Baten (1981) have also found that it is the number of propositions, not words, that affects the reading process.

## B. GRAMMATICAL VS. LEXICAL COHESION

### 1. The Doctoring Procedure

#### a. Constraints on Test Development

The findings of this thesis depend largely on the doctoring procedure. For this reason it was carried out with great care and its word corpus minutely examined. Items of cohesion were inserted according to the taxonomy of Halliday and Hasan (1976). Since the texts were used as actual mid-year and final examinations, they could not be distorted as a result of the doctoring procedure.[1] To keep the texts sounding natural, we could not insert too many items of cohesion. In fact, the proportion of cohesive items in the texts was surprisingly small. In the original versions of Texts 2-4, 3% - 4% of the total number of words were items of grammatical cohesion, and 6% - 8% were items of lexical cohesion (see Appendix C, Tables 2 and 3). In the doctored versions of Texts 1-6, the percent of items was not so much higher: 4% - 12% grammatical items in the grammatical versions, 5% - 12% lexical items in the lexical versions. Because of the necessity of keeping the prose as natural as possible, it was not always possible to insert as many items (or as many examples of items) of each feature as would have been desirable in order to obtain statistically significant results. Thus the range of the item sample was restricted by the framework of the experiment, and this restriction, no doubt, affected the results.

Furthermore, each version was not purely either grammatical or lexical; it did not contain only those items to be tested. It was not possible to completely eliminate grammatical items from the lexical version, and vice versa. In Texts 1-6, the grammatical version contained as many as 2% - 7% items of lexical cohesion although the lexical version contained only up to 1% grammatical items. By increasing the frequency of the cohesive items, we had hoped to create texts that would indicate general, if not clear-cut, tendencies. However, the most important procedure was to keep the texts sounding natural, similar to the texts students would ordinarily be reading.

Another difficulty was categorization of the cohesive items according to Halliday and Hasan (1976). Sometimes a word might be thought to function in more than one way, and decisions were made confining words to specific categories. This was in fact a very difficult task. Since the number of cohesive items was relatively small, discrepancies in categorization could affect test results.[2] Tables 20-25 (Appendix C) list the questions and the corresponding items of cohesion in the text. If categories overlap, double-counting occurs whereby an item is counted as pertaining to more than one feature. Including such items in a category may inflate it artificially and make it less valid than if categories were mutually exclusive. Yet words sometimes do have more than one function simultaneously, and the categories are not hard-and-fast entities. For these reasons the task of categorization was a dificult one.

### b. Findings

#### 1) Flesch Reading Ease Readability Formula

For Tests 1-6, the Flesch Reading Ease Readability Formula was applied to the first 100 words. Results showed the grammatical versions to be more difficult than the lexical versions (chi-square test for goodness of fit: chi-square = 6.75, df=1, p<.01).

#### 2) M-C Tests

There was a total of 120 questions (six texts, each with twenty M- C questions). For M-C Tests 1-6, t-tests and F-tests (ANOVA) were applied to test scores (see Appendix C, Table 18, "Results of M-C Questions on Texts Doctored for Grammaical and Lexical Cohesion," and Table 27, "M-C Questions With Significant Differences"). No significant differences between grammatical and lexical versions were found, except in one year (1978). Usually the grammatical versions were harder, but not significantly so.

Applying t-tests to the separate questions according to version (e.g., the results of Question 1 in the lexical and grammatical versions), it was found that for 25 questions (21%) of the total 120 questions there wa a significant difference between grammatical and lexical text versions (see Table 18). The number of questions was relatively small, however, and there does not seem to be any reason for those particular questions to be significantly different.

According to the results of F-tests, 18 (72%) of the 25 questions were more difficult in the grammatical version, 6 (24%) of these questions were harder in the lexical version, and 1 question (4%) had the same mean Easiness Index in both versions. T-tests were also applied to all 120 M-C questions. There were fewer significantly different questions between grammatical and lexical versions found by the t-tests than were found by the F-tests: 7 questions out of the total 120, all of which were more difficult in the grammatical version. Only 2 (8%) of the 25 questions that were found significant in F-tests, however, were the same ones that were found significant in the t-tests. Moreover, the percent of significant questions out of the total was relatively small (F-tests: 25 out of 120 = 21%, 18 more difficult grammatical out of 120 = 15%; t-tests: 7 more difficult grammatical out of 120 = 6% of the total questions).

Although the general direction of the Easiness Indices of the M-C questions, from both F-tests and t-tests, indicates that the grammatical versions were more difficult than the lexical versions, nevertheless, these results were not indicated in the total test results. It may be concluded that these particular questions were significantly different by chance. Alternatively, it may also be concluded that although there was a general tendency for the grammatical versions to be more difficult, this tendency was so slight that it did not affect overall test results.

## 2. Hierarchy of Features of Cohesion

### a. Categorization of Questions According to Features of Cohesion

Each of the twenty questions accompanying each of the six tests was categorized according to the features of cohesion included in the text (Halliday and Hasan 1976). The reader would supposedly need to comprehend these items of cohesion in the text in order to answer the questions. The weighted mean was calculated for each feature separately. Mid-year Tests 1-4 were examined separately from the more difficult Final Tests 5 and 6 (see Appendix C, Table 14, "Hierarchy of Easiness Indices of Questions related to sections of text containing cohesive items (Texts 1-4)"). No hierarchy of difficulty was found to exist. In fact, if anything, the mid-year exam questions had an inverse relation to the final exam questions. Correlations between sets of items in Tests 1-4 and Tests 5-6 were negative: r (grammatical) = -.34, r (lexical) = -.69, and r (both grammatical and lexical together) = -.36.

Moreover, no feature consistently indicated difficulty by having a low Easiness Index for all the texts. A question including text that contained a lexical cohesive marker that was a general word, for example, was not necessarily either easier or more difficult than a question relating to a section of text which contained any other items of cohesion. In Tests 1-4, questions relating to general words were of the same difficulty level as lexical repetition and synonyms, and grammatical extra-textual cohesion, nominal substitution, demonstratives, and reference. In Tests 5 and 6, questions containing general words were on the same level as lexical superordinates and grammatical extra-textual cohesion, reference, and clausal substitution. These were all items of average difficulty.

On the other hand, items that had very low Easiness Indices for one set of texts were not so difficult for the other set. In Tests 1-4, questions containing verbal (e.g., do, have) and clausal (e.g., so, not) substitution were most difficult. In Tests 5 and 6, however, verbal substitution ranked next to easiest and clausal substitution was of average difficulty. Likewise, nominal substitution (e.g., one, some, few), which was most difficult in Tests 5 and 6, was found to be next to easiest in Tests 1-4.

Of all the features, clausal substitution was most consistently found in the group of difficult features. It makes sense that when a single word (e.g., so, not) stands for an entire clause, it would cause the reader some effort to find the clause and place it in the new context. This process would probably be more demanding of the reader than simply matching a pronoun and its one-word nominal referent.

These results involve differences in text (and/or test) difficulty as well as in student proficiency level. Tests 1-4 were mid-year exams, administered after fifty hours of instruction (mean scores: 63% - 66%); Tests 5-6 were final exams, administered after 100 hours of instruction (mean score: 53%). For one of the five testing years, 1980, the same students took all six tests (see Appendix C, Table 18, "Results of M-C Questions on Texts Doctored for Grammatical and Lexical Cohesion").

### b. Repetition and Difficulty

Though it is difficult to generalize, one can say that sections of a text containing either lexical or grammatical repetition were easier to read than other parts of the text. Rather than causing an obstacle to reading (e.g., the cohesive item it repeated through two or more sentences in a cohesive chain and possibly causing confusion), repetition actually seemed to aid the students. This finding confirms work by Flesch (1950), Sim (1979), Bensoussan (1980), and Baten (1981).

Lexical repetition involves the repetition of the original word in the text. Grammatical repetition is the cohesive chain formed by the original word, its referent (e.g., it), and the repetition (at least once) of that referent (see Appendix C, Tables 11-13, "Cohesive Chains"). According to Table 14, Appendix C, "Hierarchy of Easiness Indices," repetition was the easiest feature in Tests 5 and 6 (61%) and was also relatively easy in Tests 1-4 (61%). Lexical repetition, also second highest in Tests 1-4 (66%), appeared much more problematic in Tests 5-6 (52%). Since there was overlapping (i.e., the same section of text containing more than one feature of cohesion), it is not clear whether this low mean was the result of lexical repetition alone or additional, intervening factors. The fact that this figure was based on as many as 141 questions suggests the latter possibility — that the sections of text on which the questions were based contained features other than lexical repetition. As a general trend, then, mean Easiness Indices of questions on texts containing lexical and grammatical items of repetition were relatively high. There was no special difficulty in those questions.

Repetition may have the opposite effect from that of text condensation (see below C. COHESION, pp. 182-183). Repetition of a word or idea may serve as reinforcement and therefore make the text easier to read.

### c. Cohesion: A Single Continuum of Difficulty

Viewing cohesion as a semantic relation which is realized through the lexicogrammatical system, Halliday and Hasan (1976) state:

> The distinction between grammatical and lexical is only one of degree .... Some forms of cohesion are realized through the grammar and others through the vocabulary. (p. 6)

The categories of Halliday and Hasan (1976) which are relevant to the present study are reference, substitution, ellipsis, and lexical cohesion. For the purposes of this study, we decided to separate these two types of cohesion even more sharply than do Halliday and Hasan (1976) and to include reference, substitution, and ellipsis in the single category of grammatical cohesion.

The results indicate that the effect of a cohesive item appears to depend on the text and the reader, but not on the type of cohesion. Statistically, there did not appear to be two separate and distinct types of cohesion, but rather a single continuum of twelve features whose difficulty levels varied according to the texts. Repetition appeared to make reading easier, whether it was repetition of nouns (lexical) or pronouns (grammatical).

Although in terms of descriptive grammar it may be justifiable to separate cohesion into lexical and grammatical categories, nevertheless on the practical level, there seemed to be no difference in the way they affected reading difficulty. For our purposes, it did not seem to matter whether the features were grammatical or lexical. They appeared to hinder reading comprehension to approximately the same extent.

### 3. Crossing of Test Results: Ease and Difficulty

In this study, features of cohesion as causes of reading difficulty have been researched. In many cases, separate isolated items caused reading diffculty. Yet the repetition feature of cohesion, in both lexical and grammatical versions, was not found to be a hindrance. Thus the positive effect of repetition could cancel out some of the negative effects of other features of cohesion.

## C. COHESION: THE PROBLEM FOR EFL READERS

Items of grammatical and lexical cohesion present two different kinds of reading problems. Grammatical cohesion shortens a text without reducing the number of propositions. The resulting condensation may in itself be a factor causing difficulty. Individual items of ellipsis and nominal, verbal, and clausal substitution that mark the place of nouns, verbs, and clauses must be recognized as such by the reader. But there are no semantic clues in these words: they are simply place markers. Hence readers may be confused about what a particular item may stand for in a text. For example, if the word "such," two sentences above in this text, is misconstrued as referring to "nouns, verbs, and clauses" instead of "individual items of ellipsis and ... substitution," the reader will be confused.

Items of lexical cohesion present another kind of difficulty. Except for repetition, where the reader readily recognizes the marker of cohesion, synonyms and superordinates must be seen as identifying the same referent as the original word in the text. This process can be carried out only if the reader understands the meaning of the words -- something that cannot be taken for granted with our EFL students. Furthermore, general words such as "process" and "something" (as in the previous sentence of this text) carry almost as little semantic meaning as items of grammatical cohesion. For items of lexical cohesion, then, readers have a double problem: recognizing the relation between the words and understanding their meanings.

Items of cohesion mark relations between words: their purpose is to facilitate reading. For native speakers who are fluent readers, and who may not even need markers of cohesion, they probably do. Most of our EFL students, however, may be similar to the not-so-fluent native readers (Marshall and Glock 1978-79) who cannot infer information and therefore need the help of markers of cohesion (see Chapter Two, C.2.b.1)a)2), Concentration of Information, pp. 60-62). If they are not able to decipher the markers of cohesion, however, readers cannot use them as aids or signals in the text. As a result, rather than facilitating discourse processing, for those not-so-fluent readers who cannot understand them, markers of cohesion may actually hinder comprehension.

The problem is identical for both markers of grammatical and lexical cohesion. If the reader misses the relation between certain words, whether they are a noun and its pronoun or a noun and its superordinate, the meaning of at least part of the text is lost.

Although this problem can arise either within a single sentence (or proposition) or between sentences (or propositions) and even paragraphs, it is basically a micro-level problem. That is, readers are required to see the relations among words in the discourse. In most prose passages, the problem rarely arises on the macro-level of comprehension (i.e., paragraph level, illocutionary force). Usually, on the macro-level, other contextual clues intervene to reinforce the marker of cohesion. When the item of cohesion spans the paragraph level without the help of redundancy, however, lack of comprehension of the cohesive marker would also be expected to affect macro-level comprehension.

## D. SUMMARY AND CONCLUSION

The present study approached the problem of the relation between cohesion and reading difficulty from the point of view of the advanced EFL learner. A distinction was made between lexical and grammatical cohesion, and texts were doctored separately to contain predominantly items of either one type of cohesion or the other. Following the taxonomy of Halliday and Hasan (1976), grammatical cohesion included pronouns, substitution, ellipsis, and exophoric reference. Lexical cohesion included general words, superordinates, synonyms, and repetition. Original texts were compared with those doctored for cohesion; lexical and grammatical doctored texts were compared with each other.

Text difficulty for six texts was evaluated by the Flesch Reading Ease Readability Formula and the Easiness Indices of M-C questions on the texts. There was no clear-cut indication that the original version could be considered consistently differing in difficulty from the doctored versions. Conversely, for the most part, the doctored versions were at least as difficult as the original. Results were similar for grammatical and lexical text versions. It was concluded that although grammatical and/or lexical cohesion may not be greater obstacles to comprehension than other given elements in a text, they nevertheless contributed to reading difficulty.

## NOTES TO CHAPTER FIVE

1. I am grateful to the teachers of the Department of Foreign Languages, Haifa University, for their help in editing the texts to make them sound more natural. (See Notes on Chapter Three, Note 3.)

2. Words were categorized in consultation with Prof. E.A. Levenston, Department of English, The Hebrew University of Jerusalem. Nevertheless, categories are not hard-and-fast, and some decisions were difficult to make (see above, Chapter Two, B.3.f., Boundaries between Grammatical and Lexical Cohesion, pp. 48-49).

# CHAPTER SIX

# SUMMARY AND CONCLUSIONS

## A. Summary of Findings

Taking into account both reader and text, this investigation of causes of reading difficulty addressed itself to two factors in the reading process: the reader's ability to understand sequences of propositions (i.e., coherence) and his/her familiarity with markers of cohesion. Inadequacy in either of these two areas was expected to hinder the reading comprehension of students of EFL (English as a Foreign Language).

Text was defined as a realization of the meaning of a discourse. A given text, then, would be one alternative version of _n_ possible versions of that particular discourse. The six texts in the investigation were analyzed on the micro-level (i.e., word and sentence) and the macro- level (i.e., paragraph and whole-text). Both the surface meaning of utterances (i.e., propositional content and paragraph level concepts) and the intention of the utterances (i.e., sentence function and illocutionary force) were examined as possible causes of difficulty.

The factor of reading difficulty was quantified and operationally defined in terms of scores on M-C comprehension tests and rational cloze tests. These findings were compared with results of the Flesch Reading Ease Readability Formula and oral interviews with fifteen of the students who had taken the M-C tests.

It was assumed that coherence and cohesion were two causes of reading difficulty for advanced Israeli students of EFL. In order to test the effect of coherence and cohesion, six texts were doctored by including markers of grammatical or lexical cohesion and by reordering the sentences in the texts. This study examined the difference in difficulty levels of the alternative text versions.

### 1. Coherence

The sequencing of information, that aspect of coherence on which this study focused, was indeed found to be a factor causing reading difficulty. The order in which information appeared in a text seemed to make a difference in the students' ability to comprehend it. Thus the first research question (see Chapter One, D. Research Questions, pp. 13-14) was answered in the affirmative.

Operating on the macro-level, coherence deals with the purpose and intention of the text -- the impression it makes on the reader. On the propositional level, the text focuses on certain aspects of a given situation. It is the reader's task to comprehend an argument by understanding not only each separate proposition, but also how it is linked to the ones preceding and following it. These links may be overt, signalled by cohesive markers, or covert, implied rather than explicitly stated.

Psycholinguists have called the reader's ability to process information by integrating propositions into larger units "chunking" (see Miller 1956, Smith 1978, Kieras 1978). Using different terminology for the same phenomenon, van Dijk (1977b, 1980) explains that readers derive macro-structures, or meaning on the global level, from micro-structures, or propositions on the local level.

For students of EFL, however, the ease with which integration occurs appears to depend to a certain extent on the sequence in which the information or propositions are presented. Some versions of text were found to be significantly easier than others if the sentences were sequenced in one order as opposed to another.

Several factors were found to contribute to differences in the effects of sequencing: additive vs. contrastive paragraph structure and top- down (i.e., main idea first) vs. bottom-up structure (i.e., beginning with secondary ideas and leading up to the main point). Greater difficulty was found to result from contrastive and bottom-up paragraphs than from additive and top-down paragraphs. The most difficult type of text, therefore, would be one beginning with secondary ideas or examples, followed by contrasting ideas or qualifications and their examples, before finally leading up to the main idea of the text. The easiest paragraph structure, then, would be a text beginning with the main idea followed by amplification (e.g., explanation or examples).

A third factor affecting the coherence of a text was the appearance of explicit, overt markers of cohesion. Their function and/or the ideas they linked sometimes changed with the reordering of information. Cohesion was therefore considered to interact with coherence in the reordering of information.

## 2. Cohesion

### a. Grammatical vs. Lexical

Cohesion, defined in this study in terms of grammatical cohesion (anaphora and cataphora), substitution, and ellipsis, and lexical cohesion (general word, synonym, superordinate, and repetition), appeared to affect textual coherence. As a separate, single factor, however, cohesion did not appear to affect reading difficulty. This finding ran contrary to the expectations of the researcher who expected to find that either grammatical or lexical markers of cohesion, or both, would significantly affect text difficulty. One of the reasons for this expectation was the manner in which the two types of cohesion affected text length. The grammatical text versions were generally shorter than the lexical ones since the grammatical markers of cohesion such as it, this, or so used one word in place of a clause or sentence, or else, as in the case of ellipsis, were eliminated altogether. Thus the grammatical versions were more condensed than the lexical. One of the reader's tasks was to locate, trace, and reconstruct the antecedents of items of grammatical cohesion.

Another reason for expecting cohesion to affect difficulty was the wide lexical knowledge demanded of readers by lexical markers of cohesion. Readers need to recognize that synonyms, superordinates, and/or general words are equivalent to certain lexical antecedents in the text. In addition to being able to trace these markers, readers must also know their semantic meanings. The problem of vocabulary is thereby added to the problem of having to link propositions.

Theoretically, markers of cohesion should help students find their way through a text by indicating the links between propositions. It was assumed that readers who are unable to understand these markers cannot use them as signposts to navigate through the texts. Moreover, rather than serving as helpful clues, cohesive markers are assumed to be either ignored by the weaker readers, or worse, to become stumbling blocks which hinder progress through the text.

No statistical evidence, however, was found to support the claim that markers of grammatical or lexical cohesion specifically caused reading difficulty. It also appeared that grammatical and lexical cohesion were of relatively equal difficulty for advanced students of EFL.

### b. Hierarchy of Features

Finding no significant differences between grammatical and lexical cohesion, the researcher examined each feature separately. Repetition of both lexical and grammatical items (i.e., nouns and pronouns) was the only feature that did not appear to contribute to reading difficulty. The other features (e.g., substitution, ellipsis, general words) contributed occasionally, but without any discernible pattern, depending on the context. It was not possible, however, to arrive at a hierarchy of difficulty for features of cohesion.

The question was then raised as to whether there is a practical dichotomy between grammatical and lexical cohesion. As Halliday and Hasan (1976) pointed out, the classification is not always easy to make, as there is some overlapping between the two categories. In terms of reading difficulty, this study found no differences among features of grammatical and lexical cohesion.

## B. LIMITATIONS

### 1. Texts

#### a. Classification System

The system of classification designed by Halliday and Hasan (1976), distinguishing between lexical and grammatical cohesion, does not present a clear delineation. Cohesion being a semantic relation,

> there is no hard-and-fast division between vocabulary and grammar; the guiding principle in language is that the more general meanings are expressed though the grammar, and the more specific meanings through the vocabulary. (p. 5)

The classification, then, and its labelling are somewhat misleading because "grammatical" is not meant to exclude the semantic component found in "lexical." But neither can the notion of lexical cohesion wholly exclude the grammatical.

Within this system, there are eight subgroups of grammatical cohesion and four subgroups of lexical cohesion. This classification system was meant to be descriptive and was not originally intended to relate to reading difficulty. It seems plausible, then, within the eight subgroups of grammatical cohesion, and/or the four of lexical cohesion, that some would cause difficulty in reading, whereas others might actually aid comprehension.

That is, the emphasis on two distinct kinds of cohesion, lexical and grammatical, may be misleading. Rather, each of the twelve subgroups of cohesion may affect reading comprehension independently. Further research may be carried out beginning from the starting point of twelve subgroups of cohesion rather than two.

### b. The Doctoring Procedure

Since these experiments were actually used as achievement tests at the end of each semester, our first priority was for the texts to sound as natural as possible. Bearing this criterion in mind, we were not always able to write in enough items of cohesion so that each feature of cohesion would be adequately presented. The net result may have been that the less frequent features of cohesion were virtually ignored on the statistical level.

On the other hand, given the fact that the original undoctored texts are a mixture of grammatical and lexical cohesion, the effect of doctoring would be to produce a somewhat "unnatural" text. In the doctoring procedure, the equivalent amount of "unnaturalness" in both grammatical and lexical versions may have been produced, thus cancelling any special effect.[1]

Furthermore, isolating the features absolutely so that there would be only grammatical items in the grammatical text version, for example, was almost impossible. There was some overlapping of lexical items in the grammatical version, and vice versa. At most, moreover, cohesive items made up only 12% of the total number of words in any text version. This ratio may have been insufficient to show statistically significant differences.

Finally, in any given text there is so much redundancy in the use of cohesive markers thaat it may not matter if the reader cannot identify them all (Weaver 1962, Hatch 1979).

### c. Subject Matter

The subject matter of the texts may not have appealed to the teachers choosing the texts and/or to the students taking them. In the first instance, teachers gave certain texts to fewer students. In the second, lowered student motivation may have been reflected in disproportionately lower test scores than students' English proficiency level would have warranted.

### d. Discourse Patterns: Sentence Function, Illocutionary Force, and Paragraph-Level Concepts

Application of these terms to any particular text is a subjective exercise since they do not lend themselves readily to qualitative examination. Decisions on classification made by the researcher might have been made differently by others in the field. It is also true, however, that this understanding of sentences and their functions on different levels of meaning is an inevitable feature of comprehension. Thus Cicourel (1980) states:

> The fact that a particular utterance can be classified as conveying different speech acts and multiple messages gives this type of analysis the flavor of an expansion that goes beyond the data given. This expansion is a built-in feature of the interpretation that parses and classifies utterances into speech act categories. (p. 110)

Accepting the fact that some items could be classified as exemplifying more than one feature, the researcher included as wide a range of features as was logically possible in the classification of the texts.

## 2. Tests

### a. Multiple-Choice (M-C) Tests

To a large extent, the success of the research depended on the quality of the M-C questions. Unfortunately, a few questions had to be accepted with low Discrimination Indices (point-biserial correlations between the student response and the total raw test scores that were below .30) Pretesting was not always possible, and even when questions were re-worded on the basis of item analysis results of the previous year, the new questions were not always much more successful than the old. Except for these few questions, however, the tests were generally satisfactory. Moreover, although M-C tests are only an indirect measure of text difficulty, this is a drawback they share with most other kinds of tests. Hence other test types were used to measure text difficulty as well (see below, C.3., Testing and Research, pp. 202-203).

### b. Number of Direct Multiple-Choice Questions

Although every effort was made to ask at least one question for each section of text that was doctored (i.e., contained items of grammatical or lexical cohesion), it sometimes happened that this was impossible. Either the nature of the text or the overlapping of questions made it necessary to ask whole-text level or word-level questions in place of the desired sentence-level or paragraph-level questions. Enough specific questions were asked, however, to provide results indicating general trends.

### c. Double-Counting

In some cases, one question covered a section of text containing more than one feature of cohesion. In that case, the question was counted twice (or more), once for each feature. Although this occured rarely, it did not permit a truly separate analysis of each feature of cohesion. Future research could be designed to take this into account. It should be kept in mind, however, that texts by nature contain overlapping elements, and that any attempt at separation would be artificial.

### d. Matching Items of Cohesion With Questions

It was difficult to match items of cohesion with specific questions. Ultimately, this matching was made according to the subjective judgment of the researcher. To compare this judgement with that of others in the field of EFL, the researcher gave one sample text and questions (Test 2, original and reordered grammatical versions, OG and RG) to a class of seven students in the M.A. TESL (Teaching English as a Second Language) program at Tel Aviv University, some of whom were already teaching EFL. They were acquainted both with M-C testing and Halliday and Hasan (1976).[2] The students were asked to list the items and features of cohesion, if any, found in the section(s) of text that needed to be understood in order to answer each question. The students worked in groups: two pairs on the original version and a group of three on the reordered version. There were two native speakers of English: one worked on the original version the other on the reordered version.

The percentage of concurrence between the evaluations of the researcher and those of the raters was not high: the mean was 68% and the median was 100% concurrence (see Table 33). A chi-square test for goodness of fit yielded no significant values and Kramer's C values were not high for either original or reordered versions (C values ranged from .28 to .38).

The main reason for the relatively low correlations between the researcher and the raters was disagreement about how much text needed to be read in order to answer the questions. The inconsistency did not reflect a disagreement over the taxonomy or its application. Nonetheless, the low figures would indicate that replicating this experiment would not be an easy matter.

### e. Test Difficulty and Student Performance

If the texts and questions were too difficult for students, scores would be too low, the distribution of scores too narrow, and thus no significant differences would appear. To a large extent, this experiment depended on the appropriateness of the level of difficulty for the student population. Item analysis indicated that Tests 1-4 were on the appropriate level and that Tests 5-6 were a bit difficult for the students. Given that Tests 5-6 were final examinations, however, they needed to be harder, because of departmental requirements, than Tests 1-4 which were mid- year exams. The differences in levels of difficulty between the final and mid-year exams did not change the general conclusions of this study.

### f. Reordering: Text or Test

Test results were based on the Easiness Indices of M-C questions answered by students reading the texts. Since this is an indirect measure of text difficulty, one cannot be sure whether the results reflect text difficulty, question difficulty, or both (i.e., test difficulty). For this reason comparisons were made among the four doctored versions of each of the six texts (i.e., original grammatical (OG), original lexical (OL), reordered grammatical (RG), and reordered lexical (RL).

It was not possible, however, to compare the six texts to determine whether or not they were of equal difficulty, since the set of questions for each text was different. Theoretically, the same question appearing in all six tests could have approximately the same Easiness Index for each test, provided that the texts were all on the same level of difficulty. Empirically, however, it was impossible to ask the same M-C question on all six tests. Instead, we assumed that the sample populations were on the same level of English proficiency, and we compared mean test scores and standard deviations. Thus we found Tests 1-4 to be on one level of difficulty (mean scores: 63%-66%) and Tests 5-6 to be fairly more difficult (mean scores: 51%-54%) — see Appendix C, Table 18, "Results of M-C Questions on Texts Doctored for Grammatical and Lexical Cohesion," and Table 19, "Coherence -- Results of M-C Questions in Original and Reordered Versions of Text."

### g. Rational Cloze Procedure

Some students found the large number of items (approximately 40-50 blanks) frustrating and gave up before the end. There were enough students who did finish, however, and statistical corrections were made. The unanswered items, like unanswered questions in M-C tests, were removed from the final calculations.

## 3. Sampling Procedure

### a. Equivalence of Tested Groups

The sample was not randomly chosen. Choosing the texts for their own classes, it was the teachers who decided which students would read which texts. Moreover, the teachers were convinced by looking at the texts that the reordered versions were more difficult than the original, and were therefore reluctant to administer these test versions to their students. For this reason, groups were not equivalent in size. Neither was there any guarantee that the English proficiency of all the groups was equivalent. All that can be ascertained is that the English proficiency for the whole population was equivalent from year to year.

### b. Test Performance

Whereas some students do better on tests because of increased motivation, other students do worse on tests than during a normal reading situation. Tension and nervousness may decrease students' reading comprehension performance (Ebel, 1979, p. 5).

## C. APPLICATIONS

### 1. Teaching

This study emphasizes the importance of context in reading comprehension by showing that difficulties are not limited to single lexical items but rather related to the connection between ideas in sentences. It confirms conclusions also drawn by Gorman (1979) and Grellet (1981). Thus Grellet:

> But, if reading is to be efficient, the structure of longer units such as the paragraph or the whole text must be understood. It is no good studying a text as though it were a series of independent units. This would lead the students (a) to become dependent on understanding

> every single sentence in a text, even when this is not necessary to fulfil their reading purpose, with the result that they would tend to read all texts at the same speed and (b) to be reluctant to infer the meaning of sentences or paragraphs from what comes before or after. (p. 6)

The point of diagnosing difficulties is to be able to help students overcome them. A number of techniques for testing clause and sentence comprehension and analyzing errors were developed by Corder (1977), who also found students lacking the ability to integrate the separate parts of the text:

> The first task, as always, is to identify the error. Since here we are dealing with a 'discourse' it may be that while the learner can interpret all the parts, he may not be able to interpret the logical connections or relations between the parts. A study of the learners' attempts does, in fact, suggest that this does indeed happen. (p. 149)

According to Corder (1977), Gorman (1979) and Grellet (1981), students have difficulty understanding the relations among sentences. Students are aware of this problem, according to their answers on questionnaires (see Chapter One, B.2.a., EFL Students' Opinions, pp. 7-9). It would be helpful to students if reading comprehension exercises included not only the skills of finding the meanings of words and phrases, but also the skills of determining possible sentence functions according to their apearance in context (i.e., determining the meaning of a sentence in terms of the sentences preceding and following it). That is, teachers could work on tables such as Tables 5-10 (see Appendix C) together with students in class on any given text -- arriving at sentence functions, illocutionary force of paragraphs, paragraph-level concepts, and the general focus of the text as a whole.

Subjective though this exercise may be, it emphasizes the relations between sentences and paragraphs. Finding the "correct" sentence function would not be the point of the exercise. Arriving at a mutually agreed on sentence function or illocutionary force, after discussion of alternative possibilities, however, would draw students' attention to paragraph structure and contextual relations. The usefulness of the exercise would be to help students gain insight concerning how items of cohesion relate ideas in a given text, how sentences are connected to each other, and how to identify a definition, for example, and to distinguish it from the secondary ideas and examples that follow it. In this way, teachers can encourage EFL students to read texts and to comprehend discourse rather than to decipher single words or decode a series of separate propositions. The emphasis when reading should be to see the text as a whole.

### 2. EFL Course and Test Design

In designing EFL courses and the diagnostic or achievement tests which accompany them, course and test designers make decisions concerning difficulty. Results of this study indicate that not only vocabulary but also aspects of cohesion (e.g., types of sentence and paragraph connectors) and coherence (e.g., additive vs. contrastive or top-down vs. bottom-up paragraph structure) should be examined and included as well. According to their answers to questionnaires (see Chapter One, B.2.c., Discrepancies between Views of EFL Students and Teachers, pp. 11-12), students are more aware of the difficulties of coherence and cohesion than some teachers. Even without pre-testing, course and test designers could briefly scan texts for these characteristics to predict level of reading difficulty for students.

### 3. Testing and Research

Test results from the various methods were fairly similar: coherence was found to be a factor related to reading difficulty whereas cohesion could not be directly connected. The Flesch Reading Ease Readability Formula, discourse analysis, rational cloze tests, and M-C questions accompanying texts were all used to examine the same phenomenon: the possible effects of coherence and cohesion on reading difficulty. There was a difference in the kind of information used as the basis for these methods. Some methods are based on the text only, whereas others are based on students' reading of the text, and others on answering questions on the text. These convergent measures pointed to the same conclusion: sequencing of information affects reading difficulty. The differences among the methods did not not emerge in the findings (i.e., whether or not there was a significant difference between texts caused by coherence or cohesion).

### a. Text-based

#### 1) Flesch Readability Formula

The Flesch Formula yields a figure which represents a general approximation of a text's grade level correct to within a year. Although it has the advantage of taking only a short time to calculate, as a measurement tool, it is not very sensitive to changes in text.

#### 2) Discourse Analysis

A technique to describe, not measure texts, discourse analysis can be used in two ways:

a) when there are pre-determined needs of content or structure, to determine whether a particular text fits the required model

b) together with test results either to explain the statistical results, or conversely, to trace the effects of text structure and/or sentence and paragrah functions

### b. Test-based (text + student)

Care must be exercised in generalizing on the basis of results from a tested sample of students to the larger population. Test results depend on the appropriateness of the text for the group tested. With this qualification in mind, we came to the following conclusions concerning the testing methods used in the present study.

#### 1) Rational Cloze Procedure

The rational cloze procedure can be used as a measure of text difficulty. Depending on the placement of blanks, different kinds of tests can be obtained. Blanks can be placed to test content words, function words, parts of seech, markers of cohesion; these words can be on the micro-level or the macro-level. The cloze does not necessarily test the student's grasp of the content or ideas in the text, however.

#### 2) M-C Questions

M-C questions measure text difficulty only indirectly. Easiness Indices reflect the difficulty of both the text and the questions. Without careful oral interview work, it is not possible to know how much each of these two factors contributed to the Easiness Index of any given M-C question. Test results of M-C questions can be used, provided that questions are fair and present no special difficulties of their own (e.g., (1) a difficult word in the question that does not appear in the text, or (2) a difficult task such as finding a comparison which is implied but not explicitly stated in the text).

All of these methods can be used to explain and measure text difficulty. The appropriateness of the method depends on the purpose and needs of the research study.

## D. SUGGESTIONS FOR FURTHER RESEARCH

This study was limited to testing advanced students of EFL who were reading expository texts. The findings may not necessarily generalize to students with lower levels of proficiency, learners of other foreign languages, or even readers in the native language. Moreover, different results may be obtained for other types of text (e.g., narrative, newspaper, scientific, legal, business, etc.).

The research design in this study may be applied to different populations and text types. Native speakers of languages other than Hebrew could be tested. Looking for a threshold level at which neither coherence nor cohesion affects difficulty more than for native English speakers, researchers could examine students with different levels of proficiency (i.e., less advanced or even more advanced than in this study).

Three aspects of text analysis were examined as possibly contributing towards the difficulty differences resulting from the reordering of sentences in each text. Cohesion and two aspects of coherence (i.e., top- down/bottom-up structure, additive vs. contrastive structure) were factors found in this study. Identifying and testing other factors would be another possible area of research. There were indications, for example, that certain features of cohesion (i.e., substitution, especially clausal, and ellipsis) were linked to reading difficulty. Further research could be designed to single out these features and test this hypothesis. According to Schwartz (1983), in addition to the sequencing of information, the distance between propositions and staging were also factors that affected learning. Possibly they may affect reading difficulty as well. Further research could test this hypothesis.

Research in contrastive discourse analysis, like Kaplan's (1966), would be helpful in mapping the different prose conventions, on both micro- and macro-levels, between English and other languages. Knowing the kind of prose conventions Israelis are familiar with would help teachers point out differences between English texts and those in the native language.

Alternatively, the same sample population could be given texts of different difficulty levels to find the threshold level for that population. Comparisons could be made among text types. Because of the large number of students tested, certain test types (e.g., short answer, summary, translation of continuous prose) were not used in this study. Given smaller samples of students, these methods could also be applied.

## E. GENERAL CONCLUSIONS

The impetus for this investigation arose from the EFL classroom situation. Not much is known about the reading processes of advanced foreign language learners. Research has been carried out mostly on text recall and elementary reading by native speakers. There are so many variables affecting foreign language research (e.g., the learner's language background and number of years of foreign language study, the text's subject matter and complexity, various methods of learning, the difficulty of finding students who can be studied over a fairly long period of time, etc.) that research in this field is not an easy matter. Yet without raw data and basic facts about how advanced foreign learners actually read, present teaching materials cannot be improved. Unless we can identify the obstacles to reading, we cannot teach students how to overcome them. Initially, then, the need for more information on reading behavior inspired this study.

To find obstacles to reading, special testing methods were devised: the doctoring procedure with both M-C and rational cloze items. Discourse analysis was used to describe the texts included in the tests, and the results were interpreted in the light of psycholinguistic theory. Although most of this theory had been developed using native speakers, the resulting hypotheses were applied to this study of advanced EFL learners. Two major hypotheses were investigated: the "chunking" theory whereby readers reorganize information and, when necessary, supply missing links between propositions, as opposed to the notion that sequencing of information in a text is important and that each new bit modifies the given information that preceded it. These hypotheses about text coherence were supplemented by classification of markers of cohesion which linked propositions overtly. Although both these hypotheses have been shown to be operative for native speakers, depending on the level of proficiency in reading (Marshall and Glock 1978-79), they have not yet been researched for advanced foreign language learners. The extent to which these processes occur in our EFL readers was found to depend on how difficult the students found the texts to be.

When students found texts easy to read, sequencing of information did not significantly change test results, and it was assumed that "chunking" occurred. When students found obstacles (i.e., according to this study, contrastive paragraphs, bottom-up structure, certain cohesive items), then the significantly lower test scores could be attributed to changes in coherence (sequencing) and/or cohesion.

This study is an integrative exercise in applied linguistics, based on methods and findings in the fields of educational measurement, psycholinguistics, and discourse analysis, and applying them to the classroom situation. It is hoped that EFL course designers and teachers will use the findings of this thesis and make students aware of coherence and cohesion.

From the researcher's own experience in the classroom, exercises which increase EFL students' sensitivity to the linking devices in English texts also make them more aware of such devices in their native language, to the surprise of many, for the first time. Thus training students to recognize markers of cohesion and to focus on the relations between sentences helps them to cope with difficult EFL texts, and at the same time, to become better readers even in their native language.

Coherence and cohesion are not merely descriptive theoretical constructs, but integral factors in the reading process. An awareness of how they operate in texts will help EFL students to become more proficient readers.

## NOTES TO CHAPTER SIX

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## APPENDIX A

### QUESTIONNAIRES FOR STUDENTS OF ENGLISH AS A FOREIGN LANGUAGE

1. COURSE: Advanced Course in English ____________________

Regular Course in English ____________________

Mechina ____________________

2. Native Language ____________________

For each of the features listed, indicate your opinion on page 2.

A. Do you find this feature difficult when reading a text?

1. extremely difficult
2. fairly difficult
3. fairly easy
4. easy
5. don't know or doesn't apply

B. In order to be able to understand a text in English, mastery of this feature is

1. absolutely essential
2. important but not essential
3. not necessary

C. In the course you have just taken ( or are now taking) this feature was taught

1. always
2. often
3. sometimes
4. rarely
5. never

YOUR HIERARCHY: (A to F)

| most important | most difficult |
|---|---|
| 1 - | 1 - |
| 2 - | 2 - |
| 3 - | 3 - |
| 4 - | 4 - |
| 5 - | 5 - |
| 6 - | 6 - |

## SUMMARY CHECKLIST OF FEATURES CAUSING DIFFICULTY IN READING COMPREHENSION

A B C

A. Graphic Organization
1. ability to analyze a paragraph
2. make use of information found in the title, headings, subheadings
3. knowledge of citation procedure (footnoting, reference)

B. Rhetorical devices: argumentation -- recognizing
1. definition and classification
2. examples, illustrations and abstract ideas
3. comparison, contrast
4. causal relationship/ cause and effect
5. rhetorical question and answer
6. statement and restatement
7. explanation, clarification, description
8. generalization vs. evidence, fact
9. inference, implication
10. summary vs. accumulation of detail or listing

C. Vocabulary
1. terminology (Jargon)
2. contextual synoymous paraphrase (recognition of word/ phrase equivalents)
3. word families (stem)
4. affixes and roots (word formation)
5. multiple denotations and connotations of a word
6. false cognates
7. metaphors
8. phrasal verbs
9. collocations, idioms
10. language of caution, strength of claim, truth modifiers
11. nominalizations (use of abstract nouns instead of verbs to indicate activity -- ie, division/dividing)

D. Syntax and Grammar
1. punctuation
2. ability to recognize verb in a clause
3. ability to recognize dependent and independent clauses (subordination)
4. reference
5. noun modifiers (rank shift, determiners)
6. adverbials
7. transformations (It, There is, Passive, Cleft sentence, Questions/Requests)
8. Tense, modals, time sequence, If (conditionals)
9. sentence connectors (however, yet, since)
10. reduced relative clauses (that left out before dependent clause -- ie, He said he'd come. .... property he needed)

E. Author's involvement in text
1. purpose
2. audience
3. tone
4. degree of formality
5. which side of the argument he is on (What argument?!)
6. evaluation and opinion

F. Reader's self-confidence in reading, attitudes

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## RESPONSES OF EFL STUDENTS AND TEACHERS TO QUESTIONNAIRES

In order of difficulty, the students' opinions resulted in the following hierarchy: (1 = most difficult, 6 = easiest)

### TABLE 1: EFL Students' Opinions on Text Difficulty

Required Course (67 students)

1. vocabulary
2. rhetorical function
3. syntax/grammar
4. author's involvement
5. reader's attitude
6. (graphic organization received few votes)

Pre-Academic Courses (38 students)

1. vocabulary
2. rhetorical function
3. syntax/grammar
4. graphic organization
5. author's involvement
6. reader's attitudes

In order of importance, the students' opinions resulted in the following hierarchy: (1 = most important, 6 = least important)

TABLE 2: EFL Students' Opinions on Features of Importance in Reading

Required Course (67 students)

1. syntax/grammar
2. vocabulary
3. rhetorical function
4. author's involvement
5. reader's attitude
6. (graphic organization received few votes)

Pre-Academic Courses (38 students)

1. vocabulary
2. synxtax/ grammar
3. rhetorical function
4. graphical organization
5. reader's attitude
6. author's involvement

In order of difficulty, the teachers' opinions led to the following hierarchy: (1 = most difficult, 6 = easiest)

TABLE 3: EFL Teachers' Opinions on Text Difficulty

1. author's involvement
2. rhetorical functions (illocutionary force)
3. vocabulary
4. syntax and grammar
5. graphic organization
6. (reader's attitude not mentioned)

In order of importance, the following hierarchy resulted: (1 = most important, 6 = least important)

TABLE 4: EFL Teachers' Opinions of Features of Importance in Reading

1. reader's attitude
2. vocabulary
3. syntax and grammar
4. rhetorical functions (illocutionary force)
5. graphic organization
6. reader's attitude (Opinions were split as to whether it is most or least important.)
7. (author's involvement not mentioned)

## APPENDIX B

TEXT 2 -- original

Paragraph

(1) World population growth -- and how to slow it -- continues to be a subject of great controversy. The planet's poorest nations have yet to find effective ways to check their population increase -- at least without restricting citizens' rights and violating such traditions as the custom of having large families as insurance in old age. Population growth is the gravest issue the world faces over the decades immediately ahead. In many ways it is an even more dangerous and subtle threat than war, since it is less subject to organized control.It is not in the exclusive control of a few governments, but rather in the hands of hundreds of millions of individual parents. The population threat must be faced -- like the nuclear threat -- for what it inevitably is: a central determinant of mankind's future, one requiring far more attention than it is presently receiving.

(2) Last year the world's population passed 4 billion. Unless there is a holocaust brought on by man or nature, the world's population will continue to increase. While the growth rate in the developed nations is actually slowing down, the rate in the developing countries is accelerating rapidly. The problem, then, is to control the population growth in the developing countries where fertility is high.

(3) What, then, are some of the specific social and economic actions most likely to promote the desire for reduced fertility? The importance of enhancing the status of women is critical. Of all the aspects of social development, the educational level appears most consistently associated with lower ferility, so that an increase in the education of women tends to lower fertility to a greater extent than a similar increase in the education of men. In Latin America, for example, studies indicate that women who have completed primary school average about two children fewer than those who have not. Schooling tends to delay the age of marriage for girls, and thus reduces their total possible number of childbearing years.

TEXT 2 — original - 2 -

(5) A number of governments are moving in the direction of coercion. Some have introduced legal sanctions to raise the age of marriage. A few are considering direct legal limitations on family size and sanctions to enforce them. No government really wants to resort to this. But neither adapted any government afford to let population pressure grow so large that social frustrations finally erupt into irrational violence and civil disintergration.

(4) Furthermore, through an increase in income, families will almost certainly experience a beneficial decline in their traditionally high fertility. For the income will give them access to better health and education and living standards, which in turn are likely to lead to smaller families.

Haifa University
Department of Foreign Languages

Regular Course
Mid-term Exam 1979

## TEXT 2

OL version
original coherence
lexical cohesion

PARAGRAPH

(1) World population growth -- and how to slow it -- continues to be a subject of great controversy. The planet's poorest nations have yet to find effective ways to check this population increase -- at least without restricting citizens' rights and violating such traditions as the custom of having large families as insurance in old age. Population growth is the gravest issue the world faces over the decades immediately ahead. In many ways an increase in the earth's population is an even more dangerous and subtle threat than war, since a rise in the number of the world's inhabitants is less amenable to organized control. The problem is not in the exclusive control of a few governments, but rather in the hands of hundreds of millions of individual parents. The population threat must be faced -- like the nuclear threat -- as a central determinant of mankind's future, a problem requiring far more attention than is presently given.

(2) Last year the globe's population passed 4 billion. Unless thre is a holocaust brought on by man or nature, the process will continue. While the growth rate in the developed nations is actually decreasing, the rate in the developing countries is accelerating rapidly. The problem, then, is to control the population growth in the developing nations where fertility is high.

APPENDIX B

Haifa University
Department of Foreign Languages

Regular Course
Mid-term Exam 197[illegible]

PARAGRAPH

TEXT 2

OL version

(3) What, then, are some of the specific social and economic actions most likely to promote the desire for reduced fertility? The importance of enhancing the status of women is critical. Of all the aspects of social development, the educational level of females appears most consistently related to fertility, so that an increase in the education of women tends to lower fertility to a greater extent than a similar increase in the education of men. In Latin America, for example, studies indicate that women who have completed primary school bear about two children fewer than women who have failed to continue. (3) Schooling tends to delay the age of marriage for girls, and thus diminishes the total possible number of childbearing years.

(4) Furthermore, through an increment in income, families will almost certainly experience a beneficial decline in their traditionally high fertility. For the earnings will give access to better health, education and living standards, which, in turn, are likely to lead to smaller households.

(5) A number of governments are moving in the direction of coercion. Some governments have introduced legal sanctions to raise the age of marriage. A few governments are considering direct legal limitations on family size and sanctions to enforce the new laws. No governments really want to resort to the use of force. But neither can any government afford to let population pressure expand so that social frustrations finally erupt into irrational violence and civil disintergration.

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## APPENDIX B

Haifa University
Department of Foreign Languages

Regular Course
Mid-Term Exam 1979

PARAGRAPH

## TEXT 2

**OG version**

original coherence
grammatical cohesion

(1) World population growth -- and how to slow it-- continues to be a subject of great controversy. The world's poorest nations have yet to find effective ways to slow this growth -- at least without restricting citizens' rights and violating such traditions as the one of having large families as insurance in old age. Population growth is the gravest problem the world faces over the decades immediately ahead. In many ways it is an even more dangerous and subtle threat than war, since it is less amenable to organized control. It is not in the exclusive control of a few governments, but rather hundreds of millions of individual parents. It must be faced -- like the nuclear threat --for what it is: a central determinant of mankind's future, one requiring far more attention than at present.

(2) Last year the world's population passed 4 billion. Unless there is a holocaust brought on by man or nature, it will continue to increase. While the growth rate in the developed nations is actually slowing down, in the developing countries it is increasing rapidly. The problem, then, is to slow this down in the developing countries where fertility is high.

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Haifa University
Dept. of Foreign Languages

Regular Course
Mid-Term Exam 1979

PARAGRAPH

(TEXT 2 -- cont'd)

OC version

(3) What, then, are some of those specific social and economic actions most likely to increase the desire for reduced fertility? The importance of enhancing the status of women is critical. Of all the aspects of social development, the educational level of females appears most consistently related to fertility, so that an increase in their education tends to lower fertility to a greater extent than does a similar increase the education of men. In Latin America, for example, studies indicate that those who have completed primary school bear about two children fewer than those who have not. It tends to delay their age of marriage, and thus reduces their total possible number of childbearing years.

(4) Furthermore, through an increase in income, families will almost certainly experience a beneficial reduction in their traditionally high fertility. For this will give them access to better health, education and living standards, which, in turn, are likely to lead to smaller families.

(5) A number of governments are moving in the direction of coercion. Some have introduced legal sanctions to increase the age of marriage. A few are considering direct legal limitations on family size and sanctions to enforce them. No governments really want to resort to this. But neither can they afford to let population pressure grow so large that social frustrations finally erupt into violence and civil disintegration.

Haifa University
Dept. of Foreign Language

Regular Course
Mid-Term Exam 1979

QUESTIONS ON TEXT 2

original coherence

1. According to the first paragraph, the poorest countries

   1. have already found ways to slow down population growth
   2. have not found ways to slow down population growth
   3. want to find ways to speed up population growth
   4. will soon easily find ways to slow down population growth

2. According to the first paragraph, the custom of having large families

   1. is not insurance against poverty in old age
   2. is a tradition that the poor are not able to give up
   3. is an effective way to check population growth
   4. must be stopped, even at the risk of restricting citizens' rights

3. "the gravest" (line 7/8) means

   1. the deadliest
   2. the lowest
   3. the heaviest
   4. the most serious

4. "since" (line 10/11) means

   1. towards
   2. although
   3. because
   4. unless

5. According to the first paragraph, population growth and war

   1. are the world's greatest problems
   2. are equally dangerous problems
   3. are less dangerous than government control
   4. will not be real dangers in the near future

6. According to the first paragraph, what is not in the exclusive control of governments?

   1. thermonuclear war
   2. population growth
   3. citizens' rights
   4. organized insurance

(QUESTIONS ON TEXT 2)

7. According to the first paragraph, we don't give enough attention to

   1. nuclear threat
   2. population growth
   3. mankind's future
   4. government control

8 According to paragraph 2, the world's population is sure to increase

   1. providing there is no holocaust
   2. if there is ever a holocaust
   3. because there has been a holocaust
   4. as there may be a holocaust

9. According to paragraph 2, the world's main problem is that

   1. in all nations world population growth is slowing down
   2. in all nations world population growth is increasing
   3. the population growth of rich nations in increasing
   4. the population growth of poor nations is increasing although that of rich nations is slowing down

10. As a solution to reduce population growth, in paragraph 3, the author suggests

   1. making women feel more important
   2. raising women's social status
   3. giving women more education
   4. delaying the age of marriage for girls

11. The writer gives Latin America as an example of a country where

   1. educated women have only two children
   2. educated women have fewer children
   3. educated men have fewer children
   4. the general educational level is low

12. According to paragraph 4, reduced fertility is a result of

   1. more education for men
   2. decreasing the age of marriage
   3. a decline in living standards
   4. greater income for families

13. "will almost certainly experience" (line 39/41) means

   1. may possibly experience
   2. may certainly not experience
   3. will definitely experience
   4. will probably experience

14. "For" (line 41/42) means

    1. whether
    2. unless
    3. because
    4. although

15. "are likely to lead" (line 43/45) means

    1. are pleasurably leading
    2. are similar to leading
    3. will probably lead
    4. will easily lead

16. According to the last paragraph, some governments have to choose between

    1. letting people starve and finding them jobs
    2. permitting social disintegration or resorting to legal force
    3. increasing family income or enforcing legal sanctions
    4. improving public education or delaying the age of marriage

17. The writer ends this text with

    1. an example of a particular problem
    2. advice on how to improve education
    3. a description of the advantages of population growth
    4. a threat of what may happen

18. A good title for this text would be

    1. The Dangers of Limiting Women's Education
    2. Some Ways of Slowing Down Population Growth
    3. The Advantages of Birth Control
    4. Government Control of Population Growth in Developed Countries

19. The tone of this text is

    1. humorous
    2. sedate
    3. urgent
    4. fearful

20. In this text, the writer's main purpose is to

    1. compare two problems
    2. contradict someone's ideas
    3. narrate a story
    4. convince the reader

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Haifa University
Dept. of Foreign Languages

End of Semester Exam
Jan. 1980

## APPENDIX B

**WORLD POPULATION GROWTH** **TEXT 2** RL version
reordered coherence
lexical cohesion

lines paragraph

Last year the world's population passed 4 billion. While the growth rate in the developed nations is actually slowing down, the rate in the developing countries is accelerating rapidly. Population growth is the gravest issue the planet faces over the decades immediately ahead. Unless there is a holocaust brought on by man or nature, the process will continue. The problem, then, is to control the population growth in the developing countries where fertility is high. (1)

The globe's poorest nations have yet to find effective ways to check the population increase —at least without restricting citizens' rights and violating such traditions as the custom of having large families as insurance in old age. A number of governments are moving in the direction of coercion. No governments really want to resort to the use of force. But neither can any government afford to let population pressure grow so large that social frustrations finally erupt into irrational violence and civil disintegration. (2)

The problem is not in the exclusive control of a few governments, however, but rather in the hands of hundreds of millions of individual parents. What, then, are some of the specific social and economic actions most likely to promote the desire for reduced fertility? A few governments are considering direct legal limitations on family size and sanctions to enforce the new laws. Some governments have introduced legal sanctions to raise the age of marriage. (3)

./2

Furthermore, through an increment in income, families will almost certainly experience a beneficial decline in their traditionally high fertility. For the earnings will give access to better health and education and living standards, which in turn are likely to lead to smaller households. (3)

Of all the aspects of social development, the educational level of females appears most consistently associated with lower fertility, so that an increase in the education of women tends to lower fertility to a greater extent than a similar increase in the education of men. Schooling tends to delay the age of marriage for girls, and thus diminishes the total possible number of childbearing years. In Latin America, for example, studies indicate that women who have completed primary school average about two children fewer than women who have failed to continue. The importance of enhancing the status of women is critical. (4)

World population growth — and how to slow it — continues to be a subject of great controversy. In many ways an increase in the earth's population is an even more dangerous and subtle threat than war, since a rise in the number of the world's inhabitants is less amenable to organized control. The population threat must be faced — like the nuclear threat — as a central determinant of mankind's future, a problem requiring far more attention than is presently given. (5)

(lexical)

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Haifa University
Dept. of Foreign Languages

End of Semester Exam
Jan. 1980

APPENDIX B

## WORLD POPULATION GROWTH

TEXT 2

RC version
reordered coherence
grammatical cohesion
paragraphs

Last year the world's population passed 4 billion. While the growth rate in the developed nations is actually slowing down, in the developing countries it is accelerating rapidly. It is the gravest problem the world faces over the decades immediately ahead. Unless there is a holocaust brought on by man or nature, it will continue. The problem, then, is to slow this down in the developing countries where fertility is high. (1)

The world's poorest nations have yet to find effective ways to check this growth — at least without restricting citizens' rights and violating such traditions as that of having large families as insurance in old age. A number of governments are moving in the direction of coercion. No governments really want to resort to this. But neither can they afford to let population pressure grow so large that social frustrations finally erupt into irrational violence and civil disintegration. (2)

Population growth is not in the exclusive control of a few governments, however, but rather hundreds of millions of individual parents. What, then, are some of these specific social and economic actions most likely to increase the desire for reduced fertility? A few governments are considering direct legal limitations on family size and sanctions to enforce them. Some have introduced legal sanctions to raise the age of marriage. Furthermore, through an (3)

./2

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Lines Paragraph

increase in income, families will almost certainly experience a beneficial reduction in their traditionally high fertility. For this will give them access to better health and education and living standards, which in turn are likely to lead to smaller families. (3)

Of all the aspects of social development, the educational level of females appears most consistently associated with lower fertility, so that an increase in their education tends to lower fertility to a greater extent than does a similar increase in the education of men. It tends to delay their age of marriage, and thus reduces their total possible number of childbearing years. In Latin America, for example, studies indicate that those who have completed primary school bear about two children fewer. The importance of raising their status is critical. (4)

World population growth — and how to slow it — continues to be a subject of great controversy. In many ways it is an even more dangerous and subtle threat than war, since it is less amenable to organized control. It must be faced — like the nuclear threat — for what it inevitably is: a central determinant of mankind's future, requiring far more attention than it is presently receiving. (5)

(grammatical)

## APPENDIX B

Haifa University
Department of Foreign Languages

Regular Course
End of Semester Exam
January, 1980

Questions on text 2

reordered coherence

1 the gravest (paragraph 1) means
   1. the deadliest
   2. the lowest
   3. the heaviest
   4. the most serious

2. According to the first paragraph, the world's population is sure to increase
   1. providing there is no holocaust
   2. if there is ever a holocaust
   3. because there has been a holocaust
   4. as there may be a holocaust

3. according to paragraph 2, the poorest countries
   1. have found ways to slow down population growth
   2. have not found ways to slow down population growth
   3. don't want to find ways to slow down population growth
   4. will soon find ways to slow down population growth

4. According to paragraph 2, the custom of having large families
   1. is not insurance against poverty in old age
   2. is a tradition that the poor have not been able to give up
   3. is an effective way to check population growth
   4. must be stopped, even at the risk of restricting citizens' rights

5. coercion (paragraph 2) means
   1. force
   2. change
   3. leniency
   4. education

6. According to paragraph 2, some governments have to choose between
   1. letting people starve or finding them jobs
   2. resorting to legal force or permitting social disintergration
   3. increasing family income or enforcing legal sanctions
   4. improving public education or delaying the age of marriage

7. According to paragraph 3, what is not in the exclusive control of governments?
   1. thermonuclear war
   2. population growth
   3. the world
   4. organized control

8. will almost certainly experience (paragraph 3) means
   1. may possibly experience
   2. may certainly not experience
   3. will definitely experience
   4. will probably experience

9. For (paragraph 3) means
   1. Whether
   2. Unless
   3. Because
   4. Although

10. are likely to lead (paragraph 3) means
   1. are pleasurably leading
   2. are similar to leading
   3. will probably lead
   4. will easily lead

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Questions on Text 2 (cont'd) **reordered coherence**

11. As a way of reducing population growth, in paragraph 4, the author suggests
    1. making women feel more important
    2. raising women's salaries
    3. giving women more education
    4. delaying the age of marriage for girls

12. thus (paragraph 4) means
    1. in this way
    2. in spite of
    3. in contrast
    4. in general

13. The author gives Latin America as an example of a country where
    1. educated women have only two children
    2. educated women have fewer children
    3. educated men have fewer children
    4. the general educational level is low

14. since (paragraph 5) means
    1. towards
    2. although
    3. because
    4. unless

15. According to the paragraph 5, population growth
    1. is the world's greatest danger
    2. will not be a real danger in the near future
    3. is a less serious danger than war
    4. is as great a danger as war

16. According to paragraph 5, we don't give enough attention to
    1. nuclear threat
    2. population growth
    3. mankind's future
    4. the 4 billion mark

17. The author ends this text with
    1. an example of a particular problem
    2. advice on how to improve education
    3. a description of the advantages of population growth
    4. a threat of what may happen

18. A possible title for this text would be
    1. The Dangers of Limiting Women's Education
    2. Some Ways of Slowing Down Population Growth
    3. The Problems of Large Families in Developing Countries
    4. Government Control of Population Growth in Developed Countries

19. The tone of this text is
    1. humorous
    2. passionate
    3. objective
    4. fearful

20. The author of thid text is trying to
    1. define certain ideas
    2. contradict someone's ideas
    3. narrate a story
    4. convince the reader

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# APPENDIX B

**WORLD POPULATION GROWTH** **CLOZE PASSAGE 2** **Form 1 - original coherence**

World population growth -- and how to slow it -- continues
to be a subject of great controversy. The planet's poorest
nations have yet to find effective __(1)__ to check their 1) ______________
population increase -- at least without __(2)__ citizens' 2) ______________
rights and violating such traditions __(3)__ the custom of 3) ______________
having large families as insurance in old __(4)__. Population4) ______________
growth is the gravest issue the world faces __(5)__ the decades 5) ______________
immediately ahead. In __(6)__ ways it is an even more 6) ______________
dangerous and subtle __(7)__ than war, since it is __(8)__ 7) ______________
subject to organized control. __(9)__ growth, however, is 8) ______________
not in the exclusive control of a few __(10)__, but rather 9) ______________
in the hands of hundreds of __(11)__ of individual parents. 10) ______________
The population threat must be faced -- like the nuclear 11) ______________
threat -- for what it inevitably is: a central determinant
of mankind's future, one requiring far more attention than
it is presently receiving.

Last year the world's population passed 4 billion. Unless
there __(12)__ a holocaust brought on by man or nature, the 12) ______________
__(13)__ population will continue to increase. While the 13) ______________
growth rate in the developed __(14)__ is actually slowing 14) ______________
down, the rate in the developing countries is __(15)__ rapidly. 15) ______________
The problem, __(16)__, is to control the population __(17)__ in 16) ______________
the developing countries where fertility is __(18)__.

What, then, are __(19)__ of the specific social and 18) ______________
economic actions __(20)__ likely to promote the desire for 19) ______________
__(21)__ fertility? The importance of enhancing the status 20) ______________
of women is __(22)__. Of all the aspects of social 21) ______________
development, the educational level appears most consistently 22) ______________
associated with __(23)__ fertility, so that an increase in 23) ______________

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## WORLD POPULATION GROWTH CLOZE PASSAGE 2 Form 1

the (24) of women tends to lower fertility to a greater extent than a similar (25) in the education of men. In Latin America, for (26), studies indicate that women who have completed primary school average about two (27) fewer than those who have (28). Schooling tends to delay the age of (29) for girls, and thus reduces their total possible number of childbearing years.

(30), through an increase in income, families will almost certainly (31) a beneficial decline in their traditionally high fertility. For the (32) will give them access to (33) health and education and living standards, which in turn are likely to lead to (34) families.

A number of governments are moving (35) the direction of coercion. Some have (36) legal sanctions to raise the age of marriage. A few governments are considering direct legal (37) on family size and sanctions to enforce them. No governments (38) want to resort to this. But neither can any government afford to let population pressure grow so large that social frustrations finally erupt into irrational violence and civil disintegration.

24) ______________
25) ______________
26) ______________
27) ______________
28) ______________
29) ______________
30) ______________
31) ______________
32) ______________
33) ______________
34) ______________

35) ______________
36) ______________
37) ______________
38) ______________

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APPENDIX B

**WORLD POPULATION GROWTH** **CLOZE PASSAGE 2** **Form 2 -** reordered coherence

Last year the world's population passed 4 billion. While the growth rate in the developed (1) is actually slowing down, the rate in the developing countries (2) rapidly. Population growth is the gravest issue the world faces (3) the decades immediately ahead. Unless there (4) a holocaust brought on by man or nature, the (5) population will continue to increase. The problem, (6), is to control the population (7) in the developing countries where fertility is (8).

The planet's poorest nations have yet to find effective (9) to check their population increase -- at least without (10 citizens'rights and violating such traditions (11) the custom of having large families as insurance in old (12). A number of governments are moving (13) the direction of coercion. No governments (14) want to resort to this. But neither can any government afford to let population pressure grow so large that social frustrations finally erupt into irrational violence and civil disintegration.

(15) growth is not in the exclusive control of a few (16), however, but rather in the hands of hundreds of (17) of individual parents. What, then, are (18) of the specific social and economic actions (19) likely to promote the desire for (20) fertility? A few governments are considering direct legal (21) on family size and sanctions to enforce them. Some have (22) legal sanctions to raise the age of marriage. (23), through an increase in income, families will almost certainly (24) a beneficial decline in their traditionally high fertility. For the (25) will give them access to (26) health and education and living standards, which in turn are likely to lead to (27) families.

1) ____________
2) ____________
3) ____________
4) ____________
5) ____________
6) ____________
7) ____________
8) ____________
9) ____________
10) ____________
11) ____________
12) ____________
13) ____________
14) ____________
15) ____________
16) ____________
17) ____________
18) ____________
19) ____________
20) ____________
21) ____________
22) ____________
23) ____________
24) ____________
25) ____________
26) ____________
27) ____________

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WORLD POPULATION GROWTH CLOZE PASSAGE 2 Form 2

Of all the aspects of social development, the educational level appears most consistently associated with (28) fertility, so that an increase in the (29) of women tends to lower fertility to a greater extent than a similar (30) in the education of men. Schooling tends to delay the age of (31) for girls, and thus reduces their total possible number of childbearing years. In Latin America, for (32) , studies indicate that women who have completed primary school average about two (33) fewer than those who have (34) . The importance of enhancing the status of women is (35) .

World population growth -- and how to slow it -- continues to be a subject of great controversy. In (36) ways it is an even more dangerous and subtle (37) than war, since it is (38) amenable to organized control. The population threat must be faced -- like the nuclear threat -- for what it inevitably is: a central determinant of mankind's future, one requiring far more attention than it is presently receiving.

28) ______________
29) ______________
30) ______________
31) ______________
32) ______________
33) ______________
34) ______________
35) ______________
36) ______________
37) ______________
38) ______________

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## APPENDIX C

**TABLE 1** TEXTS RANKED ACCORDING TO FLESCH READING EASE READABILITY FORMULA

O = original version
R = reordered version

Reading Ease = 206.835 - .846 wl - 1.015 sl

wl = word length
sl = sentence length

| TEXT | original | grammatical version O | grammatical version R | lexical version O | lexical version R |
|---|---|---|---|---|---|
| 1 | 52.9 | 54.5 | 52.0 | 46.9 | 47.8 |
| 2 | 43.6 | 47.7 | 56.2 | 52.5 | 46.1 |
| 3 | 57.9 | 54.5 | 46.9 | 52.0 | 57.9 |
| 4 | 59.6 | 67.2 | 59.6 | 66.4 | 54.6 |
| 5 | - | 65.6 | 70.7 | 55.4 | 49.6 |
| 6 | - | 51.2 | 53.9 | 38.5 | 40.2 |

(The higher the score, the more difficult the text.)

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## ITEMS OF GRAMMATICAL AND LEXICAL COHESION IN ORIGINAL AND REWORDED TEXTS 1-4, 1978-80

(Figures represent number and proportion of items in each text)

| FEATURES OF COHESION | TEXT 1 | | | 2 | | | 3 | | | 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R | | | R | | | R | | | R | |
| Grammatical | O | G | L | O | G | L | O | G | L | O | G | L |
| 1 | not done | 7<br>.01 | — | 3<br>.01 | 8<br>.02 | — | 6<br>.01 | 32<br>.05 | — | 13<br>.02 | 62<br>.08 | — |
| 2 | | 9<br>.02 | 1<br>.00 | 6<br>.02 | 9<br>.02 | 2<br>.00 | 18<br>.03 | 23<br>.04 | 2<br>.00 | 18<br>.02 | 19<br>.03 | — |
| 3 | | 6<br>.01 | — | 2<br>.00 | 4<br>.01 | — | 2<br>.00 | 1<br>.00 | — | — | 5<br>.01 | — |
| 4 | | — | — | 2<br>.00 | 4<br>.01 | — | — | 1<br>.00 | — | 2<br>.00 | 2<br>.00 | — |
| 5 | | — | — | — | — | — | — | 1<br>.00 | — | — | — | — |
| 6 | | — | 1<br>.00 | 1<br>.00 | 1<br>.00 | 1<br>.00 | — | 1<br>.00 | — | — | — | — |
| 7 | | — | — | — | — | — | 3<br>.00 | 3<br>.00 | — | — | — | — |
| 8 | | 1<br>.00 | — | — | — | — | 1<br>.00 | — | — | 2<br>.00 | 2<br>.00 | 2<br>.00 |
| total: | | 23<br>.04 | 2<br>.00 | 14<br>.03 | 26<br>.06 | 3<br>.00 | 30<br>.04 | 62<br>.09 | 2<br>.00 | 35<br>.04 | 90<br>.12 | 2<br>.00 |
| Lexical | | | | | | | | | | | | |
| 9 | | 2<br>.00 | 6<br>.01 | 13<br>.03 | 7<br>.02 | 17<br>.04 | 45<br>.07 | 12<br>.02 | 39<br>.06 | 44<br>.06 | 25<br>.03 | 40<br>.05 |
| 10 | | 9<br>.02 | 14<br>.03 | 11<br>.03 | 4<br>.01 | 24<br>.05 | 4<br>.01 | 5<br>.01 | 21<br>.03 | 2<br>.00 | 5<br>.01 | 4<br>.01 |
| 11 | | — | 2<br>.00 | 3<br>.01 | 3<br>.01 | 4<br>.01 | 1<br>.00 | 1<br>.00 | 12<br>.02 | 1<br>.00 | — | 1<br>.00 |
| 12 | | 2<br>.00 | 6<br>.01 | — | — | — | — | — | — | — | — | 2<br>.00 |
| total: | | 13<br>.02 | 28<br>.05 | 27<br>.07 | 14<br>.04 | 45<br>.10 | 50<br>.08 | 18<br>.03 | 72<br>.11 | 47<br>.06 | 30<br>.04 | 47<br>.06 |
| Other | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| TOTAL NUMBER WORDS: | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

KEY: O = Original Version
R = Reworded Version
L = Lexical Cohesion
G = Grammatical Cohesion

G: 1 = repetition
2 = reference
3 = demonstratives
4 = noun subst.
5 = verb subst.
6 = clause subst.
7 = ellipsis
8 = [illegible]

L: 9 = repetition
10 = synonyms
11 = superordinates
12 = general words

[illegible]

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ITEMS OF GRAMMATICAL AND LEXICAL COHESION IN ORIGINAL AND [illegible] TEXTS 1 - 4, 1978-80

SUMMARY

| FEATURES OF COHESION | TOTAL NUMBER OF ITEMS PER FEATURE | | | TOTAL NUMBER OF QUESTIONS PER FEATURE * |
|---|---|---|---|---|
| | | E | | |
| Grammatical | O | G | L | |
| 1 | 22 | 119 | — | 34 |
| * 2 | 42 | 60 | 5 | 41 |
| 3 | 4 | 16 | — | 24 |
| 4 | 4 | 7 | — | 3 |
| 5 | — | 1 | — | 2 |
| 6 | 1 | 2 | 2 | 3 |
| 7 | 3 | 3 | — | - |
| 8 | 3 | 3 | 2 | 1 |
| total: | 79 | 201 | 9 | |
| (proportion) | .03 | .09 | .00 | |
| Lexical | | | | |
| 9 | 102 | 46 | 102 | 46 |
| 10 | 17 | 23 | 63 | 30 |
| 11 | 5 | 4 | 19 | 10 |
| 12 | — | 2 | 6 | 3 |
| total: | 124 | 75 | 190 | |
| (proportion) | [illegible] | .03 | [illegible] | |
| Other | [illegible] | [illegible] | [illegible] | |
| (proportion) | [illegible] | [illegible] | [illegible] | |
| TOTAL [illegible] [illegible]: | [illegible] | [illegible] | [illegible] | |
| (proportion) | 1.00 | 1.00 | 1.00 | |

* There is overlapping of questions. Some questions include sections of text containing more than one item (and feature) of cohesion.

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## ITEMS OF GRAMMATICAL AND LEXICAL COHESION IN ORIGINAL AND REWORDED TEXTS 5-6 (1960-1962)

(Figures represent number and proportion of items in each text.)

| FEATURES OF COHESION | TEXT 5 | | | | TEXT 6 | | | | TOTAL number of questions per feature * | |
|---|---|---|---|---|---|---|---|---|---|---|
| Grammatical | OQ | OL | RQ | RL | OQ | OL | RQ | RL | O | R |
| 1-repetition | 3<br>.01 | - | 4<br>.01 | - | 2<br>.01 | - | 2<br>.00 | - | 6 | 6 |
| 2-reference | 13<br>.02 | 1<br>.00 | 9<br>.02 | 1<br>.00 | 14<br>.02 | - | 12<br>.02 | - | 23 | 20 |
| 3-demonstratives | 4<br>.01 | 1<br>.00 | 5<br>.01 | 4<br>.01 | 5<br>.01 | 2<br>.005 | 6<br>.01 | 2<br>.005 | 11 | 14 |
| 4-noun subst. | - | - | - | - | 4<br>.01 | - | 3<br>.01 | - | 3 | 3 |
| 5-verb subst. | - | - | 1<br>.00 | - | 1<br>.00 | - | 1<br>.00 | - | 4 | 3 |
| 6-clause subst. | 2<br>.00 | - | 3<br>.00 | - | 1<br>.00 | - | 1<br>.00 | - | 2 | 6 |
| 7-ellipsis | 14<br>.03 | 2<br>.005 | 14<br>.03 | 1<br>.00 | 6<br>.01 | - | 4<br>.01 | - | 19 | 24 |
| 8-extra-textual | - | 2<br>.005 | - | 1<br>.00 | 1<br>.00 | 2<br>.005 | 1<br>.00 | 2<br>.005 | 5 | 3 |
| TOTAL: | 36<br>.07 | 6<br>.01 | 36<br>.07 | 7<br>.01 | 34<br>.06 | 4<br>.01 | 30<br>.05 | 4<br>.01 | 73 | 79 |
| Lexical | | | | | | | | | | |
| 9-repetition | 21<br>.04 | 15<br>.02 | 22<br>.04 | 12<br>.02 | 32<br>.06 | 18<br>.03 | 27<br>.05 | 11<br>.02 | 26 | 23 |
| 10-synonyms | 2<br>.00 | 57<br>.09 | 2<br>.00 | 40<br>.09 | 8<br>.01 | 29<br>.04 | 8<br>.01 | 23<br>.04 | 40 | 32 |
| 11-superord. | - | 1<br>.00 | - | 1<br>.00 | 7<br>.01 | 2<br>.00 | 1<br>.00 | 6<br>.01 | 7 | 9 |
| 12-general nouns | - | 2<br>.01 | - | 6<br>.01 | 2<br>.00 | 6<br>.01 | 7<br>.01 | 7<br>.01 | 9 | 11 |
| TOTAL: | 23<br>.04 | 75<br>.12 | 24<br>.04 | 62<br>.11 | 49<br>.09 | 55<br>.09 | 36<br>.07 | 47<br>.08 | 80 | 75 |
| Other* | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | |
| TOTAL: | [illegible]<br>1.00 | [illegible]<br>1.00 | [illegible]<br>1.00 | [illegible]<br>1.00 | [illegible]<br>1.00 | [illegible]<br>1.00 | [illegible]<br>1.00 | [illegible]<br>1.00 | | |

[illegible]

[illegible]

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## KEY TO REORDERED SENTENCES (Reordered Coherence)

TEXT 1

| original coherence | doctored coherence | paragraph |
|---|---|---|
| 1 | 18 | |
| 2 | 19 | 1 |
| 3 | 20 | |
| | 8 | |
| 4 | | |
| 5 | 1 | |
| 6 | 3 | |
| 7 | 4 | 2 |
| 8 | 2 | |
| 9 | 24 | |
| 10 | 12 | |
| 11 | 14 | |
| | 13 | |
| 12 | 15 | 3 |
| 13 | 16 | |
| 14 | 9 | |
| 15 | 10 | |
| 16 | | |
| 17 | | |
| | 21 | |
| 18 | 22 | |
| 19 | 23 | 4 |
| 20 | 5 | |
| 21 | 6 | |
| 22 | 7 | 5 |
| 23 | 11 | |
| 24 | 17 | |

TEXT 2

| original coherence | doctored coherence | paragraph |
|---|---|---|
| 1 | 7 | |
| 2 | 9 | |
| 3 | 3 | 1 |
| 4 | 8 | |
| 5 | 10 | |
| 6 | | |
| | 2 | |
| 7 | 18 | 2 |
| 8 | 21 | |
| 9 | 22 | |
| 10 | | |
| | 5 | |
| 11 | 11 | |
| 12 | 20 | |
| 13 | 19 | 3 |
| 14 | 16 | |
| 15 | 17 | |
| 16 | 13 | |
| 17 | 15 | |
| | | 4 |
| 18 | 14 | |
| 19 | 12 | |
| 20 | 1 | |
| 21 | 4 | 5 |
| 22 | 6 | |

TEXT 3

| original coherence | doctored coherence | paragraph |
|---|---|---|
| 1 | 15 | |
| 2 | 16 | 1 |
| 3 | 19 | |
| | | |
| 4 | 23 | |
| 5 | 25 | |
| 6 | 27 | |
| 7 | 24 | 2 |
| | 26 | |
| 8 | | |
| 9 | 17 | |
| 10 | 18 | 3 |
| | 1 | |
| 11 | | |
| 12 | 20 | |
| 13 | 21 | 4 |
| 14 | 22 | |
| | | |
| 15 | 2 | |
| 16 | 3 | |
| 17 | 9 | |
| 18 | 10 | 5 |
| 19 | 11 | |
| | 12 | |
| 20 | | |
| 21 | 8 | |
| 22 | 13 | 6 |
| | 14 | |
| 23 | | |
| 24 | 4 | |
| 25 | 7 | 7 |
| 26 | 5 | |
| 27 | 6 | |

TEXT 4

| original coherence | doctored coherence | | paragraph |
|---|---|---|---|
| 1 | 13 | | |
| 2 | 2 | | 1 |
| 3 | 32 | | |
| 4 | 15 | | |
| 5 | 16 | | |
| | | | |
| 6 | 31 | | |
| 7 | 25 | | |
| 8 | 9 | | 2 |
| | | | |
| 9 | 8 | | (3) |
| 10 | 10 | | |
| | | | |
| 11 | 11 | | |
| 12 | 12 | | (4)/3 |
| 13 | 20 | | |
| | | | |
| 14 | 17 | | |
| 15 | 23 | | (5)/4 |
| 16 | 18 | | |
| | | | |
| 17 | 19 | | (6) |
| 18 | 21 | | |
| 19 | 22 | | |
| 20 | 24 | | |
| 21 | | 26 | |
| 22 | | 27 | 5 |
| | | 28 | |
| 23 | | 30 | |
| 24 | | | |
| 25 | 1 | | |
| 26 | 6 | | (7)/6 |
| 27 | 29 | | |
| 28 | | 7 | |
| 29 | | 3 | 7 |
| | | 4 | |
| 30 | | 5 | (8) |
| 31 | | 14 | |
| | | | |
| 32 | 33 | | (9) |

TABLE 4 - 3 -

## TEXT 5

| original coherence | doctored coherence | paragraph |
|---|---|---|
| 1 | 15 | 1 |
| 2 | 9 | |
| 3 | 11b | |
| 4 | 2 | |
| | 7 | |
| 5 | 8 | |
| 6 | 13 | |
| 7 | 4 | |
| 8 | 3 | |
| 9 | | |
| 10 | 1 | 2 |
| 11a | 12 | |
| 11b | 28 | |
| 12 | 10 | 3 |
| 13 | 11a | |
| 14 | 5 | 4 |
| 15 | 24 | |
| 16 | 23 | |
| 17 | 22 | |
| 18 | | |
| 19 | | |
| 20 | | |
| | 21 | 5 |
| 21 | 14 | |
| 22 | 16 | |
| 23 | 19 | |
| 24 | 18 | |
| 25 | 6 | 6 |
| 26 | 27 | |
| 27 | 25 | |
| 28 | 17 | |
| 29 | 20 | |
| | 26 | |
| | 27 | |
| | 29 | |

## TEXT 6

| original coherence | doctored coherence | paragraph |
|---|---|---|
| 1 | 30 | 1 |
| 2 | 31 | |
| 3 | 33 | |
| | 34 | |
| 4 | 32 | |
| 5 | 35 | |
| 6 | | |
| 7 | 2 | 2 |
| 8 | 6 | |
| | 5 | |
| 9 | 7 | |
| 10 | 3 | |
| 11 | 4 | |
| 12 | | |
| 13 | 21 | 3 |
| 14 | 22 | |
| | 26 | |
| 15 | 25 | |
| 16 | 24 | |
| 17 | 23 | |
| 18 | 27 | |
| 19 | | |
| 20 | 11 | 4 |
| | 8 | |
| 21 | 12 | |
| 22 | 13 | |
| 23 | 14 | |
| 24 | | |
| 25 | 1 | 5 |
| 26 | 9 | |
| 27 | 10 | |
| 28 | | |
| 29 | 15 | 6 |
| | 19 | |
| 30 | 17 | |
| 31 | 18 | |
| 32 | 20 | |
| 33 | 16 | |
| 34 | 28 | |
| 35 | 29 | |

## APPENDIX C

## TABLE 4a PARALLEL QUESTIONS TESTS 1-4 1978 - 1980

| TEST 1 | | | TEST 2 | | | TEST 3 | | | TEST 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| O | O | R | O | O | R | O | O | R | O | O | R |
| 1978 | 1979 | 1980 | 1978 | 1979 | 1980 | 1978 | 1979 | 1980 | 1978 | 1979 | 1980 |
| same as 1979 | 1 | 6 | 1 | 1 | 3 | 1 | 1 | 9 | 1 | 1 | 17 |
| | 2 | 16 | 2 | 2 | 4 | test removed<br>(2) – | 2 | 8 | 2 | 2 | 18 |
| | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 14 | (18) – | 3 | 16 |
| | 4 | 18 | 4 | 4 | 14 | 4 | 4 | 15 | 3 | 4 | 4 |
| | 5 | 4 | 5 | 5 | 15 | 5 | 5 | 10 | 4 | 5 | 6 |
| | 6 | 10 | 6 | 6 | 7 | (17) – | 6 | (6) – | (19) – | 6 | 2 |
| | 7 | 11 | 7 | 7 | 16 | 6 | 7 | 12 | 5 | 7 | 10 |
| | 8 | 12 | 8 | 8 | 2 | 7 | 8 | 2 | 6 | 8 | 11 |
| | 9 | 13 | (15) – | 9 | (5) – | (14) – | 9 | (16) – | 7 | 9 | 12 |
| | 10 | 1 | 9 | 10 | 11 | 8 | 10 | 7 | (10) – | 10 | 9 |
| | 11 | 2 | 10 | 11 | 13 | 9 | 11 | 1 | 8 | 11 | 13 |
| | 12 | 15 | (11) – | 12 | (12) – | 10 | 12 | 4 | (9) – | 12 | 14 |
| | 13 | 9 | 12 | 13 | 8 | 11 | 13 | 3 | (11) – | 13 | 3 |
| | 14 | 19 | 13 | 14 | 9 | 12 | 14 | 17 | (12) – | 14 | 19 |
| | 15 | 5 | 14 | 15 | 10 | 13 | 15 | 18 | 13 | 15 | 20 |
| | 16 | 7 | 16 | 16 | 6 | 15 | 16 | 11 | 14 | 16 | 5 |
| | 17 | 8 | 17 | 17 | 17 | 16 | 17 | 13 | (16) – | 17 | 7 |
| | 18 | 17 | 18 | 18 | 18 | 18 | 18 | 5 | 15 | 18 | 8 |
| | 19 | 14 | 19 | 19 | 19 | 19 | 19 | 19 | 17 | 19 | 15 |
| | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 1 |

O = original [illegible]
R = [illegible] [illegible]

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## APPENDIX C

### TABLE 4b PARALLEL QUESTIONS TESTS 5 - 6 1980 - 1982

| TEST 5 | | TEST 6 | |
|---|---|---|---|
| O | R * | O | R |
| 1 | 4 | 1 | 14 |
| 2 | 2 | 2 | 12 |
| 3 | 3 | 3 | 13 |
| 4 | 5 | 4 | 15 |
| 5 | 7 | 5 | 18 |
| 6 | 6 | 6 | 17 |
| 7 | 8 | 7 | 16 |
| 8 | 1 | 8 | 8 |
| 9 | 12 | 9 | 7 |
| 10 | 13 | 10 | 9 |
| 11 | 14 | 11 | 10 |
| 12 | 15 | 12 | 11 |
| 13 | 9 | 13 | 1 |
| 14 | 10 | 14 | 2 |
| 15 | 11 | 15 | 3 |
| 16 | 16 | 16 | 4 |
| 17 | 17 | 17 | 5 |
| 18 | 18 | 18 | 6 |
| 19 | 19 | 19 | 19 |
| 20 | 20 | 20 | 20 |

---

* O = Original
R = Reordered

## APPENDIX C

## TABLE 5

### DISCOURSE ANALYSIS — TEST 1 (Original)

| paragraph | sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 1 | 1 | general statement | description of problem no. 1 | Old age is inevitable. | 1, 15 |
| | 2 | amplification | | | 16, 17 |
| | 3 | " | | | |
| | 4 | " | | | |
| 2 | 5 | contrasting general statement/ problem | description of problem no. 2 | It is difficult to pinpoint the beginning of old age. | 2 |
| | 6 | suggested answer | | | 18 |
| | 7 | writer contradicts answer | | | 4 |
| | 8 | " " " , quotation 1, comparison | | | 3, 5 |
| | 9 | writer's comment, comparison | | | |
| | 10 | example | | | 19 |
| | 11 | quotation 2 contradicts answer | | | |
| 3 | 12 | general statement and reason | problem no. 3 and examples | misconceptions about old age | 6, 7 |
| | 13 | example 1 | | | |
| | 14 | " evidence | | | 8 |
| | 15 | example 2 | | | |
| | 16 | " evidence | | | 9 |
| | 17 | example 3, evidence, and solution | | | |
| 4 | 18 | example | examples and solutions | Given the proper conditions, old people can be active. | 10 |
| | 19 | " , description, solution 1 | | | |
| | 20 | " , " | | | 11 |
| | 21 | writer's contrasting comment | | | |
| | 22 | example, description, solution 2 | | | 12 |
| | 23 | " , " | | | |
| | 24 | writer's comment | | | 13 |

general questions:
14, 20

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APPENDIX C TABLE 5 - 2 -

## DISCOURSE ANALYSIS — TEST 1 (Reordered)

| paragraph | (original) / sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 1 | (18) 1 | example | examples | Old people look and act younger than they are. | 1 |
| | (19) 2 | " , description, reason | | | |
| | (20) 3 | " , " , " | | | 2 |
| | (8) 4 | quotation, comparison | | | 3 , 4 |
| 2 | (1) 5 | contrast, general statement | description of problem no. 1 | Old age is inevitable. | 5, 6 |
| | (3) 6 | amplification | | | |
| | (4) 7 | " | | | |
| | (2) 8 | " | | | 7, 8 |
| | (24) 9 | writer's summary/ conclusion | | | 9 |
| 3 | (12)10 | general statement, reason | description of problem no. 2 | misconceptions about old age | 10, 11, 12 |
| | (14)11 | example 1, evidence | | | |
| | (13)12 | " , " | | | |
| | (15)13 | example 2, evidence | | | 13 |
| | (16)14 | " , " | | | |
| | (9)15 | writer's comment, comparison | | | |
| | (10)16 | example, " ," | | | 14 |
| 4 | (21)17 | writer's contrasting comment | solution | importance of being needed | 15 |
| | (22)18 | example, solution 1 | | | |
| | (23)19 | " , " | | | |
| 5 | (5)20 | general statement | description of problem no. 3 | It is difficult to pinpoint the beginning of old age. | |
| | (6)21 | suggested answer | | | 16, 17 |
| | (7)22 | writer contradicts answer | | | 18 |
| | (11)23 | quotation, comparison, contradicts answer too | | | |
| | (17)24 | evidence, solution 2 | | | |

general questions:
19, 20

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DISCOURSE ANALYSIS — TEST 2 (Original)

| paragraph | sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 1 | 1 | general statement | problem stated | threat of population growth, warning not always recognized | 1 |
| | 2 | amplification | | | 2 |
| | 3 | restatement, writer's opinion | | | 3 |
| | 4 | " , contrast | | | 4 |
| | 5 | " , " , parallel idea | | | 5, 6 |
| | 6 | " , comparison, summary | | | 7 |
| 2 | 7 | evidence | description | problem (cont'd) | 8 |
| | 8 | cause, result | | | |
| | 9 | evidence, contrast | | | |
| | 10 | conclusion | | | |
| 3 | 11 | question | solutions | increased education for women | 9 |
| | 12 | answer | | | 10 |
| | 13 | restatement, result, contrast | | | 11 |
| | 14 | example | | | |
| | 15 | result | | | |
| 4 | 16 | parallel idea, answer | " | increased family income | 12, 13, 14 |
| | 17 | amplification | | | |
| 5 | 18 | restatement, answer | conclusion | dilemma of governments in using coercion | 15, 16, 17 |
| | 19 | amplification | | | |
| | 20 | " , contrast | | | |
| | 21 | " , " | | | |
| | 22 | conclusion | | | |

general questions:
18, 19, 20

DISCOURSE ANALYSIS — TEST 2 (Reordered)

| paragraph | (original) | sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|---|
| 1 | (7) | 1 | fact | problem stated | threat of population growth | |
| | (9) | 2 | contrast | | | |
| | (3) | 3 | writer's opinion | | | 1 |
| | (8) | 4 | " , cause/result | | | 2 |
| | (10) | 5 | conclusion / solution | | | 3 |
| 2 | (2) | 6 | problem with solution | discussion of solution | dilemma of governments in using coercion | 4 |
| | (18) | 7 | " | | | 5 |
| | (21) | 8 | " | | | 6 |
| | (22) | 9 | " , contrast, cause/effect | | | |
| 3 | (5) | 10 | writer's contrasting comment | " | increased family income — solution problematic | 7 |
| | (11) | 11 | question | | | |
| | (20) | 12 | answer = solution 1 | | | |
| | (19) | 13 | solution 2 | | | |
| | (16) | 14 | solution 3, cause/ effect | result | | 8 |
| | (17) | 15 | explanation | | | 9, 10 |
| 4 | (13) | 16 | solution 4, cause/ effect | " | increased education for women | 11 |
| | (15) | 17 | amplification | | | 12 |
| | (14) | 18 | example | | | 13 |
| | (12) | 19 | writer's comment, conclusion | | | |
| 5 | (1) | 20 | general statement, restatement | restatement of problem | threat of population growth | |
| | (4) | 21 | amplification, cause/effect | | | 14 |
| | (6) | 22 | writer's conclusion, restatement | | | 15, 16, 17 |

general questions: 18, 19, 20

APPENDIX C TABLE 7

Discourse Analysis — TEST 3 (Original)

| paragraph | sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 1 | 1 | general statement | description of situation | social value and psychological effects of humor | 1 |
| | 2 | amplification, cause/result, comparison | | | 2, 14, 3 |
| | 3 | " , result, contrast | | | 4 |
| 2 | 4 | definition, contrast | definition | " | |
| | 5 | " , " | | sense of humor vs. sense of the comic | |
| | 6 | " , " | | | |
| | 7 | " , " | | | |
| 3 | 8 | description | definition, classification, description | humor, the comic, laughter — discussed | |
| | 9 | " , contrast | | | 5 |
| | 10 | " , " | | | 15 |
| 4 | 11 | " , qualification | " , " , " | " | 6 |
| | 12 | " , parallel idea | | | 16 |
| | 13 | " , cause/effect | | | |
| | 14 | " , comparison | | | |
| 5 | 15 | general statement/opinion | statement, explanation | | 17 |
| | 16 | restatement | | relation between IQ and sense of humor | 7 |
| | 17 | cause/effect, example | | | |
| | 18 | example | | | |
| | 19 | " , amplification, conclusion of paragraph | | | |
| 6 | 20 | parallel idea | statement, explanation | relation between person's mood and sense of humor | 8 |
| | 21 | amplification | | | 9 |
| | 22 | example, comparison | | | 11 |
| 7 | 23 | parallel idea, comparison | statement, example | " | 10 |
| | 24 | restatement, amplification | | | |
| | 25 | example | | | 13, 18 |
| | 26 | " , amplification | | | |
| | 27 | conclusion of paragraph | | | |

general questions: 19, 20

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DISCOURSE ANALYSIS — TEXT 3 (Continued)

| Paragraph | (original) /sentence | Sentence Function | paragraph-level Illocutionary Force | paragraph-level concepts | [illegible] |
|---|---|---|---|---|---|
| 1 | (15) 1 | general statement | description of situation | humor and intelligence | 1 |
| | (16) 2 | writer's agreement | | | 2 |
| | (17) 3 | amplification | | | |
| 2 | (13) 4 | writer's comparison | statement and explanation | humor and personality/mood | 3 |
| | (21) 5 | example | | | |
| | (22) 6 | explanation | | | |
| | (24) 7 | * , writer's comment, restatement | | | 5 |
| | (26) 8 | amplification, example | | | 4 |
| 3 | (17) 9 | cause/effect, general statement | statement and explanation | conditions for humor | 6 |
| | (18) 10 | example | | | |
| | (1) 11 | result, conclusion of paragraph | | | |
| 4 | (20) 12 | parallel idea | statement and explanation, comparisons | relation between humor and intelligence | |
| | (19) 13 | amplification | | | |
| | (21) 14 | example, comparison | | | 7 |
| 5 | (2) 15 | general statement, cause/effect | statement and explanation, comparisons | situations and reasons for laughter | |
| | (5) 16 | amplification, contrast | | | 8 |
| | (1) 17 | description | | | |
| | (11) 18 | *, * , contrast | | | 10 |
| | (11) 19 | parallel idea, contrast | | | 9 |
| | (12) 20 | * , * , * | | | 11 |
| 6 | (1) 21 | description | comparisons | * | |
| | (13) 22 | * , cause/effect, comparison | | | 12, 13 |
| | (14) 23 | * , * , *, contrast | | | |
| 7 | (4) 24 | definition, contrast | definition | sense of humor vs. sense of the comic | 14, 15 |
| | (7) 25 | * , * | | | |
| | (1) 26 | * , * | | | 16 |
| | (1) 27 | * , * | | | |

general questions:
17, 18, 19, 20

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APPENDIX C TABLE 8

DISCOURSE ANALYSIS — TEST 4 (Original)

| paragraph | sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 1 | 1 | general statement | definition, classification | old money vs. new money | 1 |
| | 2 | amplification, cause/result | | | 2 |
| | 3 | " , " | | | |
| | 4 | classification, definition, contrast | | | |
| | 5 | " , comparison, summary | | | |
| 2 | 6 | general statement | description of situation | values relating money and social adjustment | 16 |
| | 7 | amplification | | | 3 |
| | 8 | conclusion of parag. | | | |
| 3 | 9 | example, parallel idea, cause/result | " | " | 4 |
| | 10 | " , amplification | | | 6 |
| 4 | 11 | example, parallel idea | " | " | 5 |
| | 12 | " , amplification | | | 17 |
| | 13 | " , " , conclusion of paragraph | | | |
| 5 | 14 | writer's comment | " | " | (8) |
| | 15 | example, contrast | | | 6, 15 |
| | 16 | conclusion parag., contrast | | | 7 |
| 6 | 17 | writer's comment, contrast | " | " | 18 |
| | 18 | example, cause/result | | | |
| | 19 | amplification | | | 8 |
| | 20 | example | | | |
| | 21 | amplification, contrast | | | |
| | 22 | " , conclusion paragraph | | | 9 |
| 7 | 23 | writer's opinion, contrast | writer's opinion, suggested solutions and their disadvantages | unfairness of inequality of distribution — money linked with happiness | 10 |
| | 24 | possible solution | | | 11 |
| | 25 | example, amplification | | | |
| | 26 | solution 1, disadvantage | | | 12 |
| | 27 | amplification, result | | | 19 |
| | 28 | solution 2, disadvantage | | | |
| | 29 | solution 3, disadvantage | | | |

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TABLE 8 - 2 -

DISCOURCE ANALYSIS — TEST 4 (Original) — cont'd

| paragraph | sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 8 | 30<br>31 | restatement of solution, indirect quote of authority to strenghten point | solution | Since money is the only thing that can be distributed, it can make people happier. | 13 |
| 9 | 32 | restatement, cause/result, summary/conclusion of text | " | " | 14<br>20 |

general question:
15

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APPENDIX C    TABLE 8    - 3 -

DISCOURSE ANALYSIS — TEXT 4 (Reordered)

| paragraph | (original) / sentence | | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|---|
| 1 | (13) | 1 | general statement | description of situation | values relating money and social prestige | |
| | (2) | 2 | cause/effect | | | |
| | (32) | 3 | restatement, amplification | | | 1<br>2 |
| | (15) | 4 | example, contrast | | | |
| | (16) | 5 | conclusion of parag. | | | |
| 2 | (31) | 6 | parallel idea, indirect quote of authority | " | " | 3 |
| | (25) | 7 | amplification, example 1 | | | |
| | (9) | 8 | " , example 2 | | | 4 |
| 3 | (8) | 9 | restatement | " | " | 5 |
| | (10) | 10 | example 1 | | | |
| | (11) | 11 | example 2 | | | 6, 7 |
| | (12) | 12 | " , amplification | | | |
| | (20) | 13 | example 3 | | | |
| 4 | (17) | 14 | writer's comment, contrast, parallel idea | problem | unfairness of inequality of distribution — money linked with happiness | 8 |
| | (23) | 15 | writer's opinion, contrast | | | 9 |
| | (18) | 16 | example 1 | | | 10, 11, 12 |
| | (19) | 17 | " , amplification | | | |
| | (21) | 18 | example 2 | | | |
| | (22) | 19 | " , amplification | | | |
| | (24) | 20 | possible solution | | | 13 |
| 5 | (26) | 21 | solution, disadvantage 1 | solution | solution: equal distribution of money — and disadvantages | 14 |
| | (27) | 22 | " , disadvantage 2 | | | 15 |
| | (28) | 23 | ", disadvantage 2 | | | |
| | (30) | 24 | restatement of solution | | | |
| 6 | (1) | 25 | restatement | " | values relating money and social prestige | 16 |
| | (6) | 26 | explanation | | | |
| | (29) | 27 | " | | | |

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DISCOURSE ANALYSIS -- TEST 4 (Reordered) — cont'd

| Paragraph | (original) | /sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|---|
| 7 | (7) | 28 | parallel idea | " | " | 17 |
| | (3) | 29 | amplification | | | 18, 19 |
| | (4) | 30 | definition, classification | | | |
| | (5) | 31 | amplification | | | |
| | (14) | 32 | conclusion of restatement | | | |

general question: 20

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APPENDIX C

TABLE 9

DISCOURSE ANALYSIS — TEST 5 (Original)

| paragraph | sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 1 | 1 | general statement, cause/effect | statement of problem description of situation | A decrease in economic growth leads to dissatisfaction in the lower classes. | 1<br>2 |
| | 2 | contrast | | | 3 |
| | 3 | writer's comment, contrast, cause/effect | | | 4 |
| 2 | 4 | question 1 | " | Unequal distribution of wealth leads to class conflict. | 20 |
| | 5 | writer's comment | | | |
| | 6 | answer, result 1 | | | |
| | 7 | qualification, addition to answer, result 2 | | | |
| | 8 | contrasting fact | | | |
| | 9 | writer's conclusion, description, result | | | 5 |
| | 10 | " , " , " | | | |
| 3 | 11 | results 1, 2, contrast | " | predicted struggles for redistribution | 7 |
| | 12 | result 3 | | | 6 |
| 4 | 13 | writer's prediction | examples | examples: England, Europe, Japan, U.S. conflict predicted in next 10-20 years | |
| | 14 | qualified fact | | | 8 |
| | 15 | general fact, example | | | 9 |
| | 16 | contrasting prediction | | | |
| | 17 | example | | | 10 |
| | 18 | example, cause/predicted result | | | |
| | 19 | example, prediction | | | 11 |
| 5 | 20 | question 2 | predicted solution 1 | predicted rise of authoritarian regimes | 12 |
| | 21 | writer's pessimistic feelings, general fact | | | 13 |
| | 22 | answer 1, generalized pessimistic prediction 1 | | | 15 |
| | 23 | emphasis | | | 14 |
| 6 | 24 | prediction 2, contrasting, optimistic | predicted solution 2 | suggested peaceful solution: redistribution of wealth, making one "middle"-class-society | 16 |
| | 25 | alternative possibilities | | | 17 |
| | 26 | answer 2, alternative poss. | | | 18 |
| | 27 | description, condition of alternative | | | |
| | 28 | amplification | | | |

general question : 19

DISCOURSE ANALYSIS — TEST 5 (Reordered)

| paragraph | (original) /sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 1 | (14) 1 | qualified fact | description of situation | Class conflicts result from unequal distribution of income. | 1 |
| | (8) 2 | fact | | | 2 |
| | (10b) 3 | fact | | | |
| | (1b) 4 | problem / cause | | | |
| | (6) 5 | result 1 / contrast | | | |
| | (7) 6 | result 2 / contrast | | | |
| | (12) 7* | result 3 / contrast | | | 3 |
| | (3) 8 | writer's comment, cause/effect | | | 4 |
| | (2) 9 | " , contrast | | | 5 |
| 2 | (1a) 10 | writer's prediction, problem | statement of problem | Decreased economic growth results in a struggle for the redistribution of wealth. | |
| | (11) 11 | amplification, cause/ effect | | | 6, 8 |
| | (27) 12 | explanation | | | 20 |
| 3 | (9) 13 | writer's conclusion, description, result | " | It is impossible to redistribute wealth equally. | 7 |
| | (10a) 14 | " , " , " | | | |
| 4 | (4) 15 | question 1 | predicted result | Decreased economic growth may result in a rise of authoritarian governments. | |
| | (23) 16 | answer, pessimistic prediction, | | | |
| | (22) 17 | restatement, emphasis | | | 9, 15 |
| | (21) 18 | writer's pessimistic feelings, general fact | | | 10<br>11 |
| 5 | (20) 19 | question 2 | examples | challenge to the middle class — examples: Europe, Japan, U.S. | |
| | (13) 20 | clarification | | | |
| | (15) 21 | 2 examples | | | 12 |
| | (18) 22* | " | | | |
| | (17) 23 | example 3 | | | 13 |
| 6 | (5) 24 | writer's comment | writer's solution | Only one solution is possible in the 10-20 year breathing spell: to fairly distribute wealth and create a single "middle" class. | 14 |
| | (24) 25 | answer, optimistic prediction | | | |
| | (16) 26* | prediction, 2 examples | | | |
| | (19) 27 | ", example 3 | | | 16, 17, 18 |
| | (25) 28 | writer's conclusion | | | |
| | (26) 29 | solution | | | 19 |
| | (28) 30 | amplification | | | |

general question: 20

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* Reordered sentence

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## APPENDIX C

## TABLE 10

### DISCOURSE ANALYSIS — TEST 6 (Original)

| paragraph | sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 1 | 1 | general statement | description of situation | 2000-year life span from cultural development to decadence | 1 |
| | 2 | amplification, classification | | | |
| | 3 | " , result/contrast | | | |
| 2 | 4 | questions 1, 2/causes | question: causes of final result | Decadence of one civilization alternates with ascendancy of another. | 2 |
| | 5 | questions 3, 4/ " | | | |
| | 6 | restatement, result | | | |
| | 7 | " , description | | | |
| | 8 | result | | | |
| 3 | 9 | writer's observation | answer/explanation for process | East and West — consecutive phases of dominance and decadence | 3 |
| | 10 | amplification | | | |
| | 11 | cause/effect | | | |
| | 12 | amplification of effect | | | |
| | 13 | writer's comment on " | | | |
| | 14 | ", main argument, contrast, comparison, qualification | | | |
| 4 | 15 | writer's comment, contrast | " | hostility and resentment of subjugated peoples | 4 |
| | 16 | result | | | 5 |
| | 17 | explanation | | | |
| | 18 | amplification | | | |
| | 19 | " , cause/effect 1 | | | 6 |
| | 20 | " , cause/effect 2, definition | | | 7 |
| 5 | 21 | examples, contrast | examples | paradox: revolt leads to dominance | 11 |
| | 22 | writer's contradictory opinion | | | 8 |
| | 23 | cause/effect, explanation | | | 12 |
| | 24 | example 1 | | | 9 |
| | 25 | example 2 | | | |
| | 26 | example 3 | | | 10 |
| | 27 | question | | | |
| | 28 | answer, restatement | | | |
| | 29 | restatement | | | |

./2

## TABLE 10 - 2 -

## DISCOURSE ANALYSIS — TEST 6 (Original) — cont'd

| paragraph | sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 6 | 30 | general statement, writer's opinion, contrast | solution, lesson to be learned | Civilization needs conflict/ friction in order to develop. | 13 |
| | 31 | clarification | | | 14 |
| | 32 | cause/effect, contrast, restatement, explanation | | | 15 |
| | 33 | alternative | | | 16 |
| | 34 | alternative 2, contrast, cause/effect | | | 17<br>18 |
| | 35 | result | | | 19 |

general question: 20

## DISCOURSE ANALYSIS — TEXT 6 (Reordered)

| paragraph | (original) /sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 1 | (30) 1 | general statement, contrast | description of situation | Civilization needs conflict/friction to develop. | 1 |
| | (31) 2 | clarification | | | 2 |
| | (33) 3 | alternative 1 | | | 3 |
| | (34) 4 | alternative 2, contrast, cause/effect, definition | | | 4 |
| | (32) 5 | restatement, contrast, cause/effect, explanation | | | 5 |
| | (35) 6 | result | | | 6 |
| 2 | (2) 7 | general statement, classification | question: causes of result | All societies end in decadence. Why? | (6) |
| | (6) 8 | result | | | |
| | (5) 9 | questions 1, 2 (causes) | | | |
| | (7) 10 | description of result | | | |
| | (3) 11 | result, contrast | | | |
| | (4) 12 | questions 3, 4 (causes) | | | |
| 3 | (21) 13 | examples: America, Russia, examples contrast | | examples of modern conflict reinforce theory | 10 |
| | (22) 14 | writer's opinion, comment | | | 8 |
| | (26) 15 | example 1 | | | 7 |
| | (25) 16 | example 2 | | | |
| | (24) 17 | example 3 | | | 11 |
| | (23) 18 | cause/effect, explanation | | | |
| | (27) 19 | question | | | |
| 4 | (11) 20 | cause/effect | answer, explanation for process | Decline creates vacuum into which another nation can enter. | 12 |
| | (8) 21 | " , process | | | 13 |
| | (12) 22 | amplification of effect | | | |
| | (13) 23 | writer's comment on " | | | |
| | (14) 24 | " , comparison/contrast, writer's main argument | | | |
| 5 | (1) 25 | examples | " | East and West — consecutive phases of dominance and decadence | 14 |
| | (9) 26 | " , amplification / writer's observation | | | |
| | (10) 27 | " , " | | | |

./2

DISCOURSE ANALYSIS — TEXT 6 (Reordered) — cont'd

| paragraph | (original) /sentence | sentence function | paragraph-level illocutionary force | paragraph-level concepts | QUESTION |
|---|---|---|---|---|---|
| 6 | (15) 28 | writer's comment, contrast | description of result examples | hostility and resentment of subjugated peoples | 15 |
| | (19) 29 | cause/effect 1 | | | 16 |
| | (17) 30 | amplification | | | 17 |
| | (18) 31 | " | | | |
| | (20) 32 | " , cause/effect 2 | | | |
| | (16) 33 | " , reason, restatement of cause/effect, process | | | 18 |
| | (28) 34 | " ," | | | 19 |
| | (29) 35 | " , " | | | |

general question: 20

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## APPENDIX C

## TABLES 11-13 COHESIVE CHAINS

### DESCRIPTION OF CHART

Horizontal axis (bottom): sentence and paragraph numbers from text

Vertical axis : Referents (nouns and noun phrases)

Each noun or noun phrase that is linked cohesively (doctored and non-doctored alike) appears to the left of the vertical axis.

On the axis itself, next to each noun or phrase, each of the three versions is indicated:

O -- Original Version
G -- Grammatical Version
L -- Lexical Version

To the right of each noun phrase, brackets enclose the sentences containing it.

Errors in doctoring are indicated by ○ .

Changes of sentence structure are indicated by ⊛.

Horizontal axis (top): Questions and Easiness Indices

For cross-reference purposes, the Question pertaining to a particular sentence and/or paragraph is indicated along the top of the graph -- along with the Easiness Index for each test version. Less effective questions (those having a Discrimination Index of less than .30) are indicated by a " * " . General questions which pertain to the text as a whole (e.g., title, main idea) are listed to the right of the chart.

## FOLLOWING THE CHART: An Analysis of Test 2

We begin reading the chart from the lower left. There is one cohesive chain, containing the phrase "world population growth" — which changes in the text to "threat." This chain begins in the first sentence and continues on through sentence 6, which is the end of the first paragraph. In the second paragraph, it reappears in sentence 9, and then disappears until the very last sentence, no. 22.

During this time other cohesive chains also make their appearance and disappearance along the chart. Each appearance of a chain is noted, whether or not any doctoring has taken place. We see that the first 5 appearances of this phrase are not in fact doctored, but remain identical in form through all 3 versions. Hence the arrow downwards from "O" to "G" to "L".

In the text, the original phrase "world population growth" (line 1) becomes "it" (line 2), "a subject" (line 2), "their population increase" (line 3), "Population growth" (line 5), and "the gravest issue" (line 6).

The sixth number (sentence 4), grammatical reference (2), is the same in the original and grammatical versions but is doctored to a lexical synonym (10) in the lexical version. In the original version, "it" (line 8); in the grammatical version, "it" (line 7); in the lexical version, "an increase in the world's population." (line 7).

The next item, "threat," a lexical superordinate (11), also remains undoctored. Then a repetition of the preceding pattern ( 2 to 10). And then there follows a different feature in each of the 3 versions for the following item in sentence 5 — in the original version, grammatical repetition (1); in the grammatical version, it is omitted altogether, resulting in a change in sentence structure (13⊛; and in the lexical version, a general word has been used (12). In the original version "It" (line 10); in the grammatical version the two sentences are combined and the item omitted altogether; in the noun version, "The problem" (line 9).

This process is repeated all through the chart for each text.

On the top horizontal axis are the test questions, directly above the sentences to which they pertain, and the Easiness Index for each of the 3 versions of text.

The questions remain identical for each test version. A difference in Easiness Index was expected to reflect the relative ease or difficulty of a particular section of text or text version.

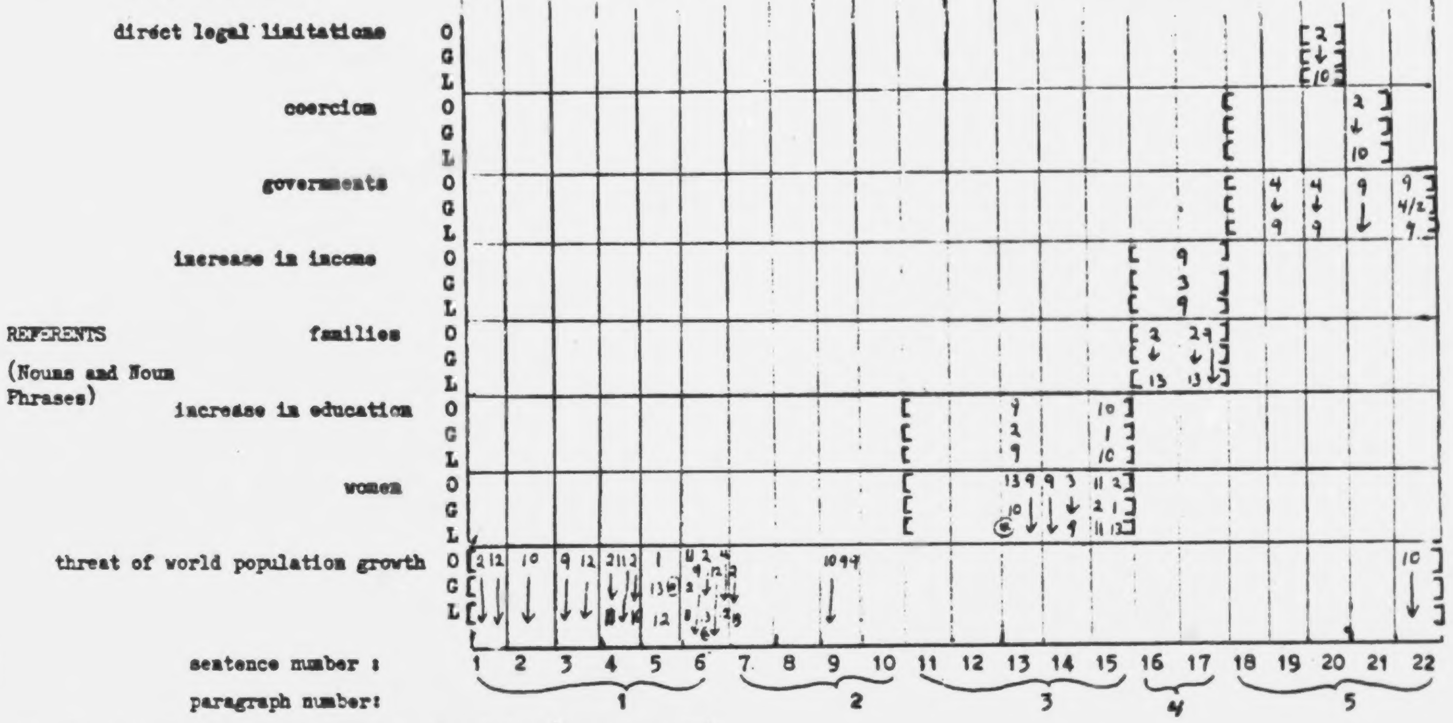
Interestingly enough, the Discrimination Index varied as well. On Test 2, Question 5, for example, is effective in the original and lexical versions but yields a low Discrimination Index (less than .30) in the grammatical version. The reverse, however, is true of Question 6, which is effective in the original and grammatical versions but not in the lexical version. The only question having a low Discrimination Index in both versions (i.e., not an effective question at all) is Question 20, a general whole-text question which can be found to the right of the sentences.

TABLE 11 -- COHESIVE CHAINS: Graphic Chart of Cohesive Items across 3 versions of text, comparison of results of test questions

APPENDIX C

TEST 2

| QUESTION NUMBER | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Original version/Easiness Index | 79 | 46 | 87 | 74* | 51 | 74 | 38 | 58 | 87* | 82 | 94* | 42* | 76 | 76 | 97* | 61 | 82* | 58* | 51 | 64 |
| Grammatical version/Easiness Index | 65 | 45 | 79 | 65 | 72* | 84 | 31 | 50 | 68 | 75* | 90* | 46 | 75 | 67 | 81 | 45 | 76 | 67 | 70 | 40* |
| Lexical version/Easiness Index | 80 | 67 | 91 | 80 | 83 | 75* | 64 | 67 | 71 | 92 | 91 | 39 | 75 | 62* | 87* | 55* | 87 | 71* | 51* | 50* |


direct legal limitations
coercion
governments
increase in income
families
increase in education
women
threat of world population growth
O
G
L
REFERENTS
(Nouns and Noun Phrases)
sentence number :
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
paragraph number:
1 2 3 4 5

General questions

$N_O$ = 39 students

$N_G$ = 45 students

$N_L$ = 56 students

t test: p < .01

* - Easiness Index* = low Discrimination Index (less than .30)

[ Begin cohesive chain
] End cohesive chain

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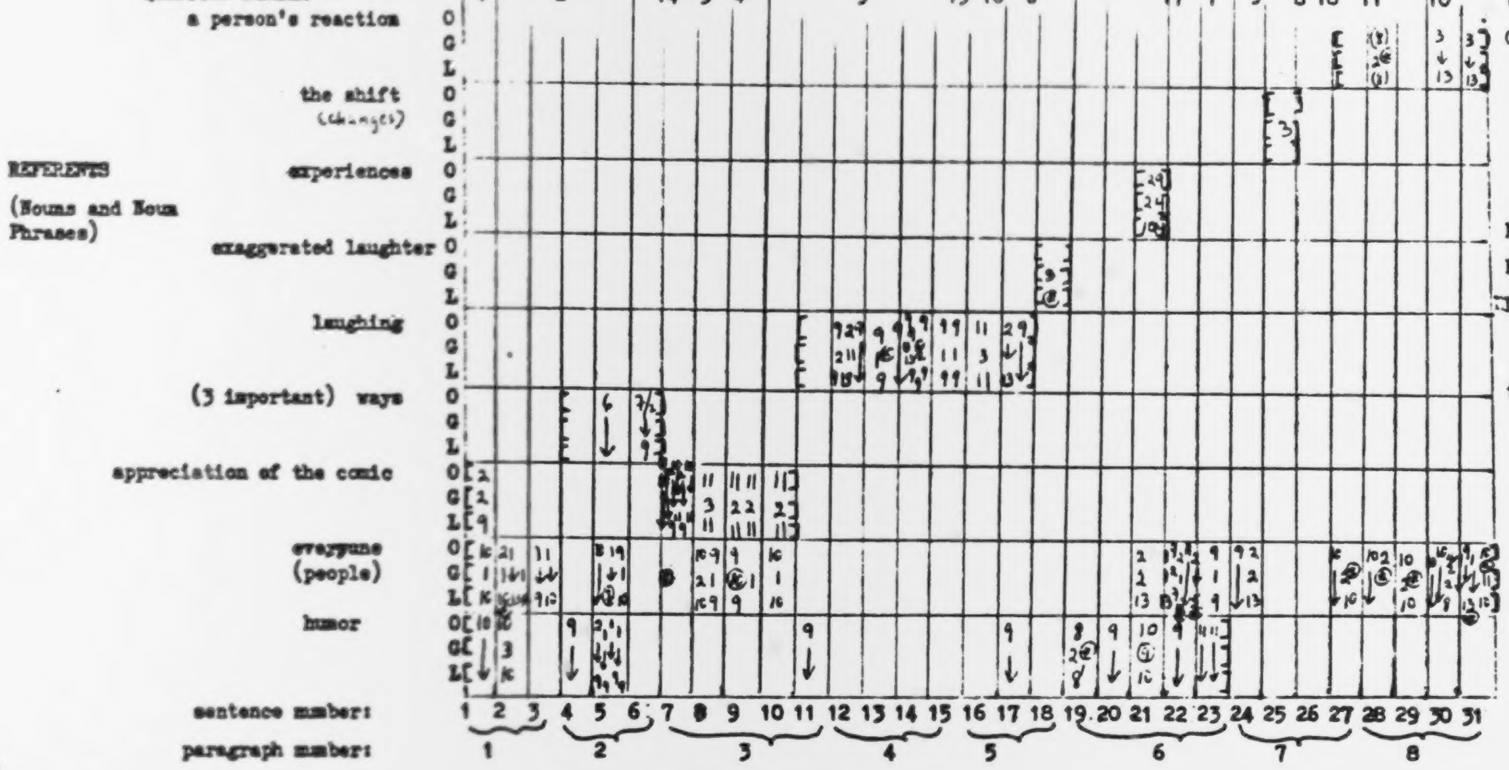
TABLE 12 — COHESIVE CHAINS: Graphic Chart of Cohesive Items across 3 versions of text, comparison of results of test questions

APPENDIX C

TEST 3

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Original version/Easiness Index | 53 | 100* | 38 | 76 | 84* | 84 | 30 | 76 | 84* | 81* | 84 | 38* | 53* | 69 | 92 | 53 | 53* | 84 | 92 | 84 |
| Grammatical version/Easiness Index | 45 | 95* | 45 | 55 | 54 | 27* | 27 | 58* | 84 | 81 | 90 | 27* | 75 | 46 | 60 | 72 | 45 | 84 | 83 | 78* |
| Lexical version/Easiness Index | 50 | 97* | 60 | 78 | 59 | 64 | 40 | 58 | 87 | 85* | 91 | 24 | 61 | 58 | 63 | 80* | 56 | 73 | 85* | 90 |
| QUESTION NUMBER | 1 | 2 | 14 | 3 | 4 | 5 | 15 | 16 | 6 | 17 | 7 | 9 | 8 | 18 | 11 | 10 | 12 | 13 | 19 | 20 |



General questions

$N_O$ = 13 students
$N_G$ = 132 students
$N_L$ = 66 students

t test: $p < .01$

* — Easiness Index* = low Discrimination Index (less than .30)
[ Begin cohesive chain
] End cohesive chain

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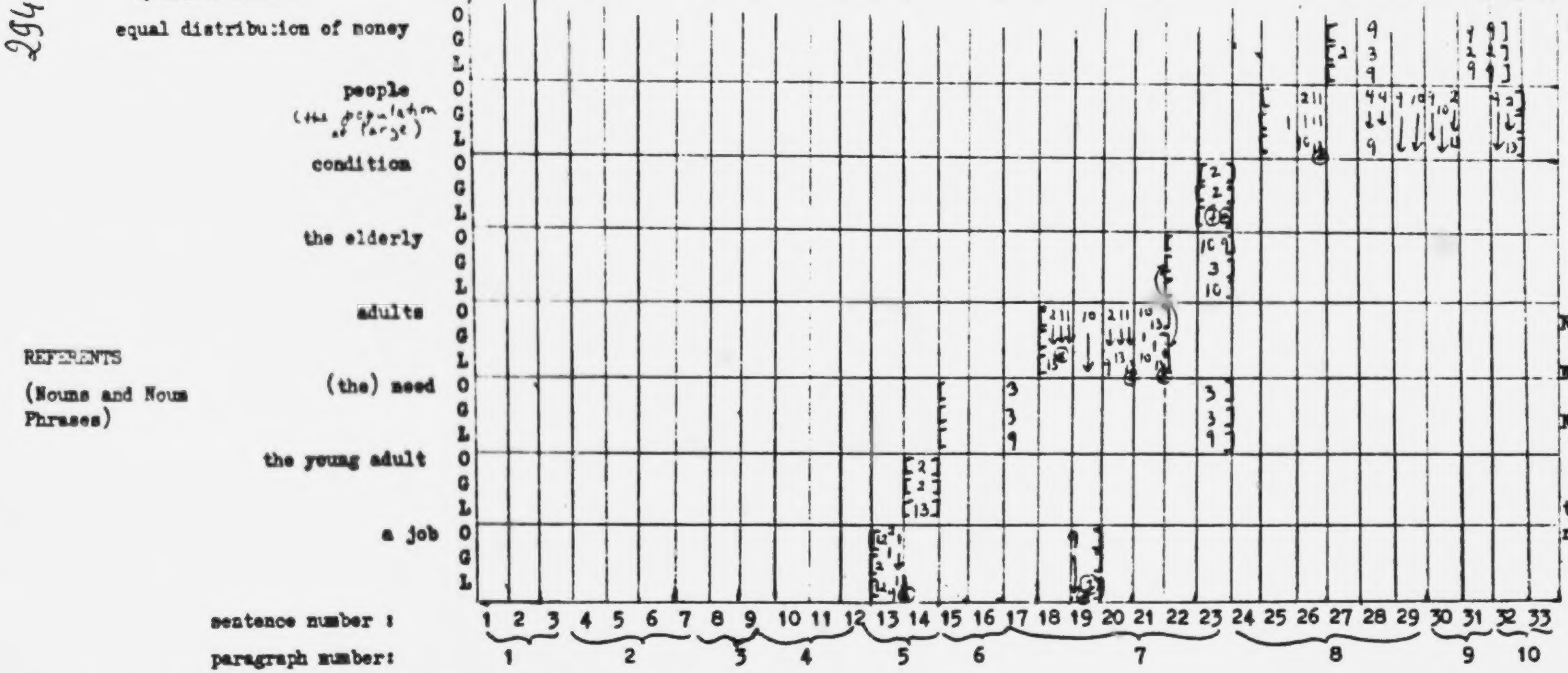
TABLE 13 — COHESIVE CHAINS: Graphic Chart of Cohesive Items across 3 versions of text, comparison of results of test questions

APPENDIX C

TEST 4

294

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Original version/Easiness Index | 67 | 83 | 61* | 79 | 77 | (75) | 33 | 71* | 37 | 75 | 45 | 39 | 65* | 51* | 47 | 91 | 69 | 57 | 53* | 53 | 83 |
| Grammatical version/Easiness Index | 68 | 98 | 48 | 88* | 92* | (75) | 43 | 70 | 48 | 75 | 50 | 41 | 70 | 66* | 48 | 92 | 77* | 37 | 28* | 57 | 83 |
| Lexical version/Easiness Index | 78 | 97 | 28 | 88 | 97* | (83) | 28 | 83 | 47 | 83 | 69* | 88* | 78 | 66 | 47* | 90* | 64* | 66 | 35* | 66 | 80 |
| QUESTION NUMBER | 2 | 1 | 14 | 3 | 4 | ( 6) | 15 | 5 | 7 | 6 | 8 | 16 | 17 | 18 | 9 | 19 | 11 | 20 | 10 | 12 | 13 |



$N_O$ = 50 students

$N_G$ = 54 students

$N_L$ = 42 students

t test: not significant

* — Easiness Index* = low Discrimination Index (less than .30)

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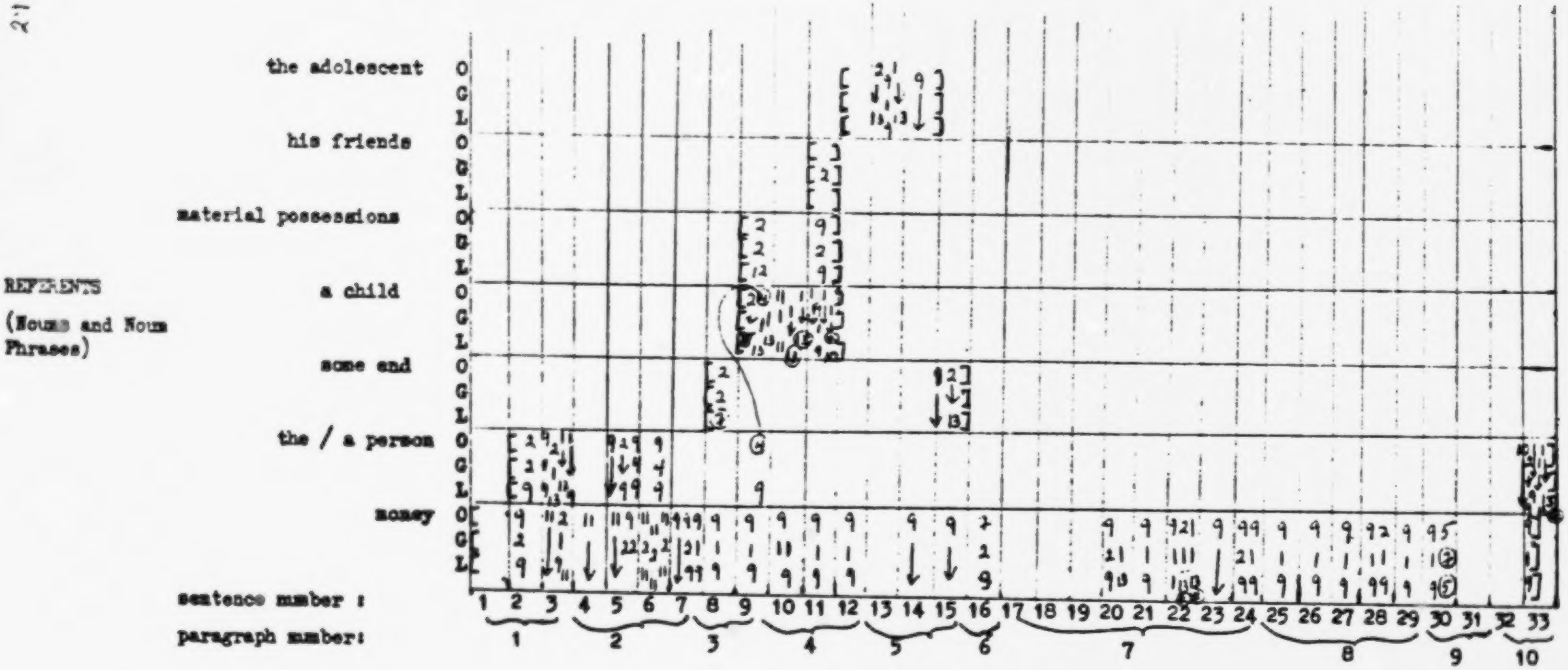
TABLE 13 — COHESIVE CHAINS **TEST 4** (cont'd) **APPENDIX C**


REFERENTS
(Nouns and Noun Phrases)
the adolescent
his friends
material possessions
a child
some end
the / a person
money
O
G
L
sentence number :
paragraph number:
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
1 2 3 4 5 6 7 8 9 10

[ Begin cohesive chain
] End cohesive chain

## TABLE 14

### HIERARCHY of EASINESS INDICES of Questions related to sections of text containing cohesive items ( TEXTS 1 - 4 )

| GRAMMATICAL COHESION | | | | LEXICAL COHESION | | | |
|---|---|---|---|---|---|---|---|
| Feature | Mean Easiness Index | number of questions | number of students | Feature | Mean Easiness Index | number of questions | number students |
| 8— extra-text. | 67.88 % | 20 | 923 | | | | |
| | | | | 10 – syn. | 67.69 % | 91 | 1004 |
| | | | | 9 – rep. | 66.31 % | 95 | |
| | | | | 12 – gen. words | 65.96 % | 19 | |
| 4 – n. subst. | 65.65 % | 28 | | | | | |
| 3 – demonst. | 65.56 % | 63 | | | | | |
| 2 – reference | 64.01 % | 68 | | | | | |
| | | | | 11 – super. | 60.45 % | 43 | |
| 1 – repetition | 61.40 % | 61 | | | | | |
| 7 – ellipsis | 59.63 % | 29 | | | | | |
| 5 – v. subst. | 50.45 % | 10 | | | | | |
| 6 – cl. subst. | 47.98 % | 4 | | | | | |
| | total: | 283 | | | | 248 | |

### (TEXTS 5 - 6)

| Feature | Mean Easiness Index | number of questions | number of students | Feature | Mean Easiness Index | number of questions | number students |
|---|---|---|---|---|---|---|---|
| 1 – | 60.61 % | 36 | 873 | | | | |
| 5 – | 60.15 % | 21 | | | | | |
| 8 – | 59.31 % | 24 | | | | | |
| | | | | 11 – | 59.12 % | 48 | 702 |
| | | | | 12 – | 58.96 % | 60 | |
| 2 – | 56.98 % | 129 | | | | | |
| 6 – | 56.94 % | 24 | | | | | |
| | | | | 10 – | 52.77 % | 186 | |
| 7 – | 52.50 % | 129 | | | | | |
| | | | | 9 – | 52.30 % | 141 | |
| 3 – | 52.33 % | 75 | | | | | |
| 4 – | 47.72 % | 18 | | | | | |
| | total: | 456 | | | | 435 | |

## APPENDIX C

### TABLE 15 RESULTS OF M-C COMPREHENSION TESTS 1 - 4 (1978 - 1980) — COHESION

Original vs. Doctored for Cohesion

O = Original version
G = Grammatical "
L = Lexical "

| TEST | | | t (paired) value * | degrees of freedom |
|---|---|---|---|---|
| 2 O | N (students) | 40 | | |
| | Mean (%) | 68.85 | | |
| | SD | 17.53 | | |
| 2 G | N | 224 | 2.03 | 19 |
| | Mean (%) | 65.15 | | |
| | SD | 15.33 | | |
| 2 L | N | 253 | .16 | 19 |
| | Mean (%) | 68.55 | | |
| | SD | 14.62 | | |
| 3 O | N | 29 | | |
| | Mean (%) | 67.25 | | |
| | SD | 17.94 | | |
| 3 G | N | 244 | 1.12 | 19 |
| | Mean (%) | 59.61 | | |
| | SD | 21.57 | | |
| 3 L | N | 350 | .12 | 19 |
| | Mean (%) | 64.87 | | |
| | SD | 18.34 | | |
| 4 O | N | 66 | | |
| | Mean (%) | 59.55 | | |
| | SD | 16.28 | | |
| 4 G | N | 201 | 1.66 | 19 |
| | Mean (%) | 59.05 | | |
| | SD | 20.09 | | |
| 4 L | N | 267 | 1.42 | 19 |
| | Mean (%) | 59.47 | | |
| | SD | 22.78 | | |

for all 4 texts: O vs. G: t (paired) = .7 (13), n.s.; F = .16 (3), n.s.
O vs. L: t (paired) = .15 (13), n.s.; F = .39 (3), n.s.

*All values not significant.

## TABLE 16

CLOZE FINDINGS

rational cloze

TESTS 1 - 3

Version 1 = Original
Version 2 = Reordered

N = 186 O: 89
R: 97

| | (df) | t | p | (df) | F | p | (%) Mean | Stand. Dev. | N |
|---|---|---|---|---|---|---|---|---|---|
| all tests together, O vs. R | (184) | 4.357 | .0001 | (96,88) | 1.64 | .05 | | | |
| original: | | | | | | | 62.0 | 14.3 | 89 |
| reordered: | | | | | | | 51.4 | 18.3 | 97 |
| all tests together: | | | | | | | | | |
| test x version | | | | (5,180) | 7.19 | .0001 | | | |
| each test separately: | | | | | | | | | |
| test x version | | | | (2,183) | 3.85 | .05 | | | |
| original vs. reordered: | | | | | | | | | |
| for each test separately | | | | (1,184) | 18.98 | .0001 | | | |
| Test 1 | (61) | 1.152 | n.s. | (28,33) | 3.00 | .005 | | | |
| original: | | | | | | | 63.3 | 18.3 | 34 |
| reordered: | | | | | | | 58.3 | 21.4 | 29 |
| Test 2 | (55) | 5.07 | .0001 | (28,27) | 1.09 | n.s. | | | |
| original: | | | | | | | 66.3 | 15.2 | 28 |
| reordered: | | | | | | | 45.4 | 15.8 | 29 |
| Test 3 | (64) | 1.33 | n.s. | (38,26) | 1.32 | n.s. | | | |
| original: | | | | | | | 55.8 | 14.1 | 27 |
| reordered: | | | | | | | 50.7 | 16.2 | 39 |
| Test 1 | | | | (1,61) | 1.33 | n.s. | | | |
| Test 2 | | | | (1,55) | 25.72 | .0001 | | | |
| Test 3 | | | | (1,64) | 1.78 | n.s. | | | |
| all Original versions: | | | | | | | | | |
| each text separately | | | | (2,86) | 4.22 | .05 | | | |
| all Reordered versions: | | | | | | | | | |
| each text separately | | | | (2,94) | 3.85 | .05 | | | |

differences: among texts
original vs. reordered, especially Test 2 (reordered more difficult)

## TABLE 17 ADDITIVE VS. CONTRASTIVE PARAGRAPHS

Pairs of Questions Relating to Sentences Containing Changes in Illocutionary Force

| | TEXT | | | | | | TOTAL (%) |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| Original Additive<br>Reordered Contrastive | - | - | 1 | 3 | 1 | 4 | 9 (8 %) |
| Original Contrastive<br>Reordered Additive | - | - | 2 | 1 | 1 | - | 4 (3 %) |
| Specific Questions<br>Common to Both Versions | 11 | 10 | 15 | 15 | 9 | 9 | 69 (57%) |
| Whole-Text Questions<br>Common to Both Versions | 9 | 10 | 2 | 1 | 9 | 7 | 38 (32%) |
| | | | | | | TOTAL: | 120 (100%)<br>questions |

APPENDIX C

## TABLE 18 RESULTS OF M-C QUESTIONS ON TEXTS DOCTORED FOR GRAMMATICAL AND LEXICAL COHESION

| TESTS | COHESION | (students) N | Mean | SD | t-value | (df) | p | F-value | (df) | p | Q * |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mid-term 1 - 4 | G | 221 | 62.9 | 19.9 | 1.55 | (439) | n.s. | 2.40 | (440) | n.s. | |
| | L | 220 | 65.9 | 20.7 | | | | | | | |
| 5 - 6 | G | 258 | 52.8 | 17.2 | .02 | (515) | n.s. | .00 | (516) | n.s. | |
| | L | 259 | 52.8 | 18.0 | | | | | | | |
| 1 - 6 | G | 479 | 57.4 | 19.5 | 1.07 | (956) | n.s. | 1.15 | (957) | n.s. | |
| | L | 479 | 58.8 | 20.0 | | | | | | | |
| 1 - 4 | G/L | | | | 1.18 | (22) | n.s. | | | | |
| 1 - 4 (1978) | G/L | | | | | | | 3.78 | (135) | .05 | |
| (1979) | G/L | | | | | | | .32 | (152) | n.s. | |
| (1980) | G/L | | | | | | | .04 | (151) | n.s. | |
| 5 - 6 | G/L | | | | .82 | (22) | n.s. | | | | |
| 5 - 6 (1980) | G/L | | | | | | | .35 | (157) | n.s. | |
| (1981) | G/L | | | | | | | .56 | (199) | n.s. | |
| (1982) | G/L | | | | | | | .01 | (158) | n.s. | |
| 1 - 6 (1980) | G/L | | | | | | | .06 | (309) | n.s. | |
| 1 | G | 61 | 67.6 | 21.0 | .70 | (119) | n.s. | .49 | (120) | n.s. | 5, 11, 16 |
| | L | 60 | 70.4 | 23.3 | | | | | | | |
| 2 | G | 54 | 65.1 | 15.6 | 1.18 | (106) | n.s. | 1.39 | (107) | n.s. | — |
| | L | 54 | 68.5 | 14.4 | | | | | | | |
| 3 | G | 53 | 58.9 | 21.0 | 1.40 | (104) | n.s. | 1.91 | (105) | n.s. | 1, 2, 4, 13, 14 |
| | L | 53 | 64.3 | 18.6 | | | | | | | |
| 4 | G | 53 | 59.7 | 23.5 | .12 | (104) | n.s. | .02 | (105) | n.s. | 2, 3, 5, 6, 10, 11 |
| | L | 53 | 59.1 | 20.4 | | | | | | | |
| 5 | G | 120 | 54.3 | 20.4 | .16 | (237) | n.s. | .03 | (238) | n.s. | 2, 3, 4, 6, 13, 14, 17, 1 20 |
| | L | 119 | 53.9 | 19.3 | | | | | | | |
| 6 | G | 138 | 51.4 | 15.5 | .23 | (276) | n.s. | .05 | (277) | n.s. | 5, 13 |
| | L | 140 | 51.8 | 15.2 | | | | | | | |

25 questions

* Questions where F-test was significant (p = .05).

## TABLE 19 COHERENCE — RESULTS OF M-C QUESTIONS ON ORIGINAL AND REORDERED VERSIONS OF TEXT

O = Original
R = Reordered

| TESTS | COHERENCE | (students) N | Mean | SD | t-value | (df) | p | F-value | (df) | p | p * |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mid-term 1 - 4 | O | 289 | 65.2 | 20.3 | 1.15 | (439) | n.s. | 1.32 | (440) | n.s. | |
| | R | 152 | 62.9 | 20.2 | | | | | | | |
| 5 - 6 | O | 278 | 54.3 | 17.1 | 2.17 | (515) | n.s. | 4.70 | (516) | .05 | |
| | R | 239 | 51.0 | 18.0 | | | | | | | |
| 1 - 6 | O | 567 | 59.9 | 19.6 | 3.31 | (956) | .001 | 10.95 | (957) | .001 | |
| | R | 391 | 55.6 | 19.7 | | | | | | | |
| 1 - 4 | O/R | | | | .83 | (22) | n.s. | | | | |
| 5 - 6 | | | | | 2.37 | (22) | .05 | | | | |
| (1980) | O/R | | | | | | | 1.77 | (157) | n.s. | |
| (1981) | O/R | | | | | | | 1.50 | (199) | n.s. | |
| (1982) | O/R | | | | | | | 13.54 | (158) | .0005 | |
| 1 - 6 (1980) | O/R | | | | | | | 1.92 | (309) | n.s. | |
| 1 | O | 81 | 67.8 | 24.0 | .84 | (119) | n.s. | .71 | (120) | n.s. | 5, 9, 11, 18 |
| | R | 40 | 71.4 | 17.7 | | | | | | | |
| 2 | O | 72 | 68.0 | 15.0 | 1.10 | (106) | n.s. | 1.20 | (107) | n.s. | 20 |
| | R | 36 | 64.6 | 15.0 | | | | | | | |
| 3 | O | 70 | 64.1 | 18.7 | 1.81 | (104) | n.s. | 3.27 | (105) | n.s. | 1, 2, 6, 8, 9, 13, 14 |
| | R | 36 | 56.8 | 21.5 | | | | | | | |
| 4 | O | 66 | 60.1 | 21.5 | .45 | (104) | n.s. | .20 | (105) | n.s. | 3, 5, 6, 10, 12, 14, 15, 19 |
| | R | 40 | 58.2 | 22.7 | | | | | | | |
| 5 | O | 119 | 56.4 | 19.9 | 1.74 | (237) | n.s. | 3.04 | (238) | n.s. | 1, 2, 3, 4, 6, 7, 10, 13, 14, 16, 17, 19, 20 |
| | R | 120 | 51.9 | 19.5 | | | | | | | |
| 6 | O | 159 | 52.8 | 14.5 | 1.49 | (276) | n.s. | 2.23 | (277) | n.s. | 2, 5, 7, 9, 15 |
| | R | 119 | 50.0 | 16.2 | | | | | | | |
| | | | | | | | | | | | 38 questions |

* Questions where F-test was significant (p = .05).

### TABLE 19a Cohesion vs. Coherence

Two-Way ANOVA: Least Square Means

COHESION

| | | Lexical | Grammatical | | |
|---|---|---|---|---|---|
| COHERENCE: | Original | 61 | 58 | 59.7 | n = 567 |
| | Reordered | 56 | 55 | 55.6 | n = 391 |
| | | 58.4 | 56.9 | | N = 958 |

F (cohesion vs. coherence) = 4.17; df = 3, 954 p = .01

F (cohesion) = 1.83; df = 1 p = ns

F (interaction) = .57; df = 1 p = ns

## TABLE 20

### MATCHING TEST QUESTIONS WITH LEXICAL AND GRAMMATICAL ITEMS OF COHESION IN THE TEXT*

### TEST 1 (1978, 1979, 1980)

| QUESTION | TYPE OF COHESION IN EACH TEST VERSION (O = Original, R = Reordered) | | | |
|---|---|---|---|---|
| | OG (1978-1979) | RG (1980) | OL (1978-1979) | RL (1980) |
| 1 | 2 | 2 | 10 | 10 |
| 2 | 2, 8 | 2, 8 | 10 | 9 |
| 3 | 3 | 3 | 11 | 11 |
| 5 | 3 | 3 | 11 | 11 |
| 6 | 3 | 3 | 9 | 9 |
| 7 | 3 | 3 | 10 | 9 |
| 8 | 1 | 2 | 10 | 10 |
| 9 | 1 | 1 | 9 | 9 |
| 10 | 3 | 3 | 9 | 10 |
| 11 | 1 | 1 | 9 | 9 |
| 12 | 1 | 1 | 10 | 10 |
| 13 | 3 | 3 | 11 | 11 |

---

*TYPE OF COHESION

TEST QUESTIONS

| | OG (1978-1979) | N | RG ( 1980) | N |
|---|---|---|---|---|
| grammatical | | | | |
| 1-repetition | 8, 9, 11, 12 | 4 | 9, 11, 12 | 3 |
| 2-reference | 1, 2 | 2 | 1, 2, 8 | 3 |
| 3-demonstratives | 3, 5, 6, 7, 10, 13 | 6 | 3, 5, 6, 7, 10, 13 | 6 |
| 4-noun subst. | - | - | - | - |
| 5-verb subst. | - | - | - | - |
| 6-clause subst. | - | - | - | - |
| 7-ellipsis | - | - | - | - |
| 8-extra-textual | 2 | 2 | 2 | 1 |
| | total: | 13 | total: | 13 |
| | OL (1978-1979) | | RL (1980) | |
| lexical | | | | |
| 9-repetition | 6, 9, 10, 11 | 4 | 2, 6, 7, 9, 11 | 5 |
| 10-synonyms | 1, 2, 7, 8, 12 | 5 | 1, 8, 10, 12 | 4 |
| 11-superordinates | 3, 5, 13 | 3 | 3, 5, 13 | 3 |
| 12-general words | - | - | - | - |
| | total: | 12 | total: | 12 |

Summary: G/L same questions

O/R different questions, same total number of questions

Implication: Changing the order of the sentences changes type of cohesion as well as coherence.

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TABLE 21

MATCHING TEST QUESTIONS WITH LEXICAL AND GRAMMATICAL ITEMS OF COHESION IN THE TEXT*

TEST 2 (1978, 1979, 1980)

| QUESTION | TYPE OF COHESION IN EACH TEXT VERSION (O = Original, R = Reordered) | | | |
|---|---|---|---|---|
| | OG (1978-1979) | RG (1980) | OL (1978-1979) | RL (1980) |
| 1 | 2 | 3 | 9, 10 | 9,10 |
| 2 | 4 | 3 | 9, 10, 11 | 10 |
| 5 | 1, 4, 7 | 1 | 9, 10, 11 | 9, 10, 12 |
| 6 | 1, 7 | 7 | 11 | 10, 12 |
| 7 | 1, 4 | 1 | 9, 11 | 9, 11, 12 |
| 8 | 2 | 1 | 9, 10, 11 | 11 |
| 10 | 2, 5 | 2, 5 | 9, 10 | 10 |
| 11 | 3, 5, 6 | 3, 7 | 9, 10 | 9, 10 |
| 16 | 2, 3, 4 | 3 | 9, 10 | 9, 10 |
| 17 | 2, 3, 4 | 1 | 9, 10 | 9, 12 |

* TYPE OF COHESION

TEST QUESTIONS

| grammatical | OG (1978-1979) | N | RG (1980) | N |
|---|---|---|---|---|
| 1-repetition | 5, 6, 7 | 3 | 5, 7, 8, 17 | 4 |
| 2-reference | 1, 8, 10, 16, 17 | 5 | 10 | 1 |
| 3-demonstratives | 11, 16, 17 | 3 | 1, 2, 11, 16 | 4 |
| 4-noun subst. | 2, 4, 5, 7, 16, 17 | 6 | - | - |
| 5-verb subst. | 10, 11 | 2 | 10 | 1 |
| 6- clause subst. | 11 | 1 | - | - |
| 7-ellipsis | 5, 6 | 2 | 6, 11 | 2 |
| 8-extra-textual | - | - | - | - |
| | total: | 22 | total: | 12 |

| lexical | OL (1978-1979) | N | RL (1980) | N |
|---|---|---|---|---|
| 9-repetition | 1, 2, 5, 7, 8, 10, 11, 16, 17 | 9 | 5, 7, 11, 16, 17 | 5 |
| 10-synonyms | 1, 2, 5, 8, 10, 11, 16, 17 | 8 | 1, 2, 5, 6, 10, 11, 16 | 7 |
| 11-superordinates | 2, 5, 6, 7, 8 | 5 | 7, 8 | 2 |
| 12-general words | - | - | 5, 6, 7, 17 | 4 |
| | total: | 22 | total: | 18 |

Summary: G/L same questions
O/R different questions, different total number of questions (fewer in R)

Implication: Changing the order of the sentences changes type of cohesion as well as coherence.

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## TABLE 22a

## Matching Test Questions with Items of Lexical Cohesion *

### TEST 3 1978 - 1980 (O = Original, R = Reordered)

ITEMS OF LEXICAL COHESION

| QUESTION | OL (1978) | OL (1979) | RL (1980) |
|---|---|---|---|
| 1 | 9, 10, 11, 12 | 9, 10, 11, 12 | 9, 10, 11, 12 |
| 2 | - | 9, 12 | 10, 12 |
| 3 | 9, 10, 11, 12 | 9, 10, 11, 12 | 9, 10, 11, 12 |
| 4 | 9, 10, 11, 12 | 9, 10, 11, 12 | 9, 10, 11, 12 |
| 5 | 9, 10 | 9, 10 | 9, 10 |
| 6 | - | 9, 10 | - |
| 7 | 9 | 9 | 9 |
| 8 | 9, 10 | 9, 10 | 9, 10, 12 |
| 9 | - | 9, 10, 11, 12 | - |
| 10 | 9, 10 | 9, 10 | 9, 10 |
| 11 | 9, 10, 11 | 9, 10, 11 | 9, 10, 11 |
| 12 | 9, 10 | 9, 10 | 10 |
| 13 | 9, 10, 11 | 9, 10, 11 | 9, 10, 11 |
| 18 | 11 | 11 | 11 |

TEST 3 - QUESTIONS

| * TYPE OF COHESION | OL (1978) | OL (1979) | RL (1980) |
|---|---|---|---|
| 9 - repetition | 1, 3, 4, 5, 7, 8, 10, 11, 12, 13 | 1, 2, 3, 4, 5, 6 7, 8, 9, 10, 11, 12 | 1, 3, 4, 5, 7, 8, 10, 11, 13 |
| 10 - synonyms | 1, 3, 4, 5, 8, 10, 11, 12, 13 | 1, 3, 4, 5, 6, 8, 9, 10, 11, 12 | 1, 2, 3, 4, 5, 8 10, 11, 12, 13 |
| 11 - superordinates | 1, 3, 4, 11, 18 | 1, 3, 4, 9, 11, 18 | 1, 3, 4, 11, 13, 18 |
| 12 - general words | 1, 3, 4 | 1, 2, 3, 4, 9 | 1, 2, 3, 4, 8 |

Note: Question no. 6 and 9 appear only in 1979.

In RL version, paragraph no. 3 is not directly tested by any specific paragraph-level question.

Summary: Changing the order of the sentences also changes the cohesive items tested by the questions.

number of questions per type of cohesion

|  | (O) 1978 | (O) 1979 | (R) 1980 |
|---|---|---|---|
| 9 - | 10 | 12 | 9 |
| 10 - | 9 | 10 | 10 |
| 11 - | 5 | 6 | 6 |
| 12 - | 3 | 5 | 5 |
| total: | 27 | 33 | 30 |

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TABLE 22b

MATCHING TEST QUESTIONS WITH ITEMS OF GRAMMATICAL COHESION*

TEST 3 1978 - 1980 (O = original, R = Reordered)

| | ITEMS OF GRAMMATICAL COHESION | | |
|---|---|---|---|
| QUESTION | OG (1978) | OG (1979) | RG (1980) |
| 1 | 1, 3, | 1, 3, 5 | 1, 2, 5 |
| 2 | - | 1, 2, 5 | 1, 2, 5 |
| 3 | 2 | 2 | 2 |
| 4 | 1, 2 | 1, 2 | 1, 2 |
| 5 | 1, 2, 5 | 1, 2, 5, 7 | 2, 5, 7 |
| 6 | - | 1, 2, 3 | - |
| 7 | 2, 3 | 1, 3 | 2, 3 |
| 8 | 1 | 2, 8 | 2 |
| 9 | - | 1, 2, 4 | - |
| 10 | 3, 7 | 7 | 7 |
| 11 | - | 3, 8 | 3, 8 |
| 12 | 1, 2, 3 | 2, 3 | 1, 3 |
| 13 | 1, 2, 3 | 1, 2, 3, 8 | 1, 2, 3, 7, 8 |

| | TEST 3 - QUESTIONS | | |
|---|---|---|---|
| * TYPE OF COHESION | OG (1978) | OG (1979) | RG (1980) |
| 1-repetition | 1, 4, 5, 8, 12, 13 | 1, 2, 4, 5, 6, 7, 9, 13 | 1, 2, 4, 12, 13 |
| 2-reference | 3, 4, 5, 7, 12, 13 | 2, 3, 4, 5, 6, 8, 9, 12, 13 | 1, 2, 4, 5, 7, 8, 13 |
| 3-demonstrative | 1, 10, 12, 13 | 1, 6, 7, 11, 12, 13 | 3, 7, 11, 12, 13 |
| 4-noun subst. | - | 9 | - |
| 5-verb subst. | 5 | 1, 2, 5 | 1, 2, 5 |
| 6-clause subst. | - | | - |
| 7-ellipsis | 10 | 5, 10 | 5, 10, 13 |
| 8-extra-textual | - | 8, 11, 13 | 1, 11, 13 |

Note: Questions no. 6, & 9 appear only in 1979.

In RG version, paragraph no. 3 is not tested by any specific paragraph-level question.

Summary: Changing the order also changes the cohesive items tested by the questions.

number of questions per type of cohesion

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| OG 1978 | 6 | 6 | 4 | - | 1 | - | 1 | - | 28 |
| OG 1979 | 8 | 9 | 6 | 1 | 3 | - | 2 | 3 | 32 |
| RG 1980 | 5 | 7 | 5 | - | 3 | - | 3 | 3 | 26 |

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APPENDIX C

TABLE 23

MATCHING TEST QUESTIONS WITH LEXICAL AND GRAMMATICAL ITEMS OF COHESION IN THE TEXT*

TEST 4 (1978 - 1980)

| QUESTION | TYPE OF COHESION IN EACH TEST VERSION (O = Original, R = Reordered) | | | | | |
|---|---|---|---|---|---|---|
| | OG (1978) | OG (1979) | RG (1980) | OL (1978) | OL (1979) | RL (1980) |
| 1 | 1, 2 | 1, 2 | 1, 2, 4, 7 | 1 | 1 | 1, 2 |
| 2 | 2 | 2 | 2 | 1 | 1, 2 | 1, 2 |
| 3 | - | 1, 2, 4, 7 | 1, 2, 4, 7 | - | 1, 2 | 1, 2 |
| 4 | 2, 3, 4 | 2, 3, 4 | 1, 2, 3 | 1 | 1, 2 | 2 |
| 5 | 1, 2, 8 | 1, 2, 7, 8 | 1, 2, 7, 8 | 1 | 1, 2 | 1, 2 |
| 6 | - | 6, 7 | 6, 7 | - | 1, 2 | 1, 2 |
| 7 | 1, 2, 3 | 2, 3, 4, 7 | 1, 2, 3, 4, 7 | 1 | 2, 3 | 1, 2, 3 |
| 8 | 1, 2, 3, 8 | 1, 2, 3, 4, 7, 8 | 1, 2, 3, 4, 7, 8 | 1 | 1, 2, 3 | 1, 2, 3 |
| 9 | 1, 2, 3, | 2, 3, 4, 7 | 1, 2, 3, 4, 7 | 1, 2 | 1, 2 | 1, 2, 3 |
| 10 | - | 4, 7, 8 | 4, 7, 8 | 1 | 1, 2 | 1, 2 |
| 11 | 1, 2, 3 | 1, 2, 3 | 1, 3 | 1 | 2 | 1, 3 |
| 12 | 2, 3, 4, 7 | 2, 3, 4, 7 | 3, 4, 7 | 1 | 2 | 1, 2 |
| 13 | 1, 2 | 1, 2 | 1, 2 | 1, 2 | 2, 4 | 2, 4 |

*TYPE OF COHESION

| TEST QUESTIONS | OG (1978) | OG (1979) | RG (1980) |
|---|---|---|---|
| 1-grammatical repetition | 1, 5, 7, 8, 9, 11, 13 | 1, 3, 5, 8, 11, 13 | 1, 3, 4, 5, 7, 8, 9, 11, 13 |
| 2-reference | 1, 2, 4, 5, 7, 8, 9, 11, 12, 13 | 1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 13 | 1, 2, 3, 4, 5, 7, 8, 9, 13 |
| 3-demonstratives | 4, 7, 8, 9, 11, 12 | 4, 7, 8, 9, 11, 12 | 4, 7, 8, 9, 11, 12 |
| 4-noun subst. | 4, 12 | 3, 4, 7, 8, 9,.10 12 | 1, 3, 7, 8, 9, 10,12 |
| 5-verb subst. | — | - | - |
| 6-clause subst. | — | 6 | 6 |
| 7-ellipsis | 12 | 3, 5, 6, 7, 8, 9, 10,12 | 1, 3, 6, 7, 8, 9,10,12 |
| 8-extra-text. | 5, 8 | 5, 8, 10 | 5, 8, 10 |

| | OL (1978) | OL (1979) | RL (1980) |
|---|---|---|---|
| 9-lexical repetition | 1, 2, 4, 5, 7, 8, 9, 10, 11, 12,13 | 1, 2, 3, 4, 5, 6, 8, 9, 10 | 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12 |
| 10-synonyms | 9, 13 | 2, 3, 4, 5, 6, 7, 8, 9, 10,11, 12, 13 | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13 |
| 11 -superordinates | - | 3 | 7, 8, 9, 11 |
| 12-general words | - | 13 | 4 |

number of questions per type of cohesion

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| OG (1978) | 7 | 10 | 6 | 2 | - | - | 1 | 2 | 28 |
| OG (1979) | 6 | 11 | 6 | 7 | - | 1 | 8 | 3 | 42 |
| RG (1980) | 9 | 9 | 6 | 7 | - | 1 | 8 | 3 | 43 |

| | 9 | 10 | 11 | 12 | TOTAL |
|---|---|---|---|---|---|
| OL (1978) | 11 | 2 | - | - | 13 |
| OL (1979) | 9 | 12 | 1 | 1 | 23 |
| RL (1980) | 11 | 12 | 4 | 1 | 28 |

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APPENDIX C

## TABLE 24

## MATCHING TEST QUESTIONS WITH LEXICAL AND GRAMMATICAL ITEMS OF COHESION IN THE TEXT*

### TEST 5 (1980, 1981, 1982)

| QUESTION | TYPE OF COHESION IN EACH TEST VERSION (O = Original, R = Reordered) OG | RG | OL | RL |
|---|---|---|---|---|
| 1 | 2 | - | 9 10 12 | 12 |
| 2 | 1 2 3 6 7 | 1 2 3 6 7 | 9 10 12 | 9 10 11 12 |
| 3 | 2 | 1 2 6 7 | 9 10 12 | 9 10 11 12 |
| 4 | 2 3 6 7 | 1 2 3 6 7 | 9 10 11 12 | 9 10 11 12 |
| 5 | 2 3 | 1 2 3 7 | 9 10 11 | 10 11 |
| 6 | 7 | 7 | 9 10 11 12 | 9 10 11 12 |
| 7 | - | - | 10 | 10 |
| 9 | 2 3 | 3 7 | 9 10 | 9 10 |
| 10 | 7 | 2 | 10 | 9 10 |
| 11 | 2 7 | 3 5 6 7 | 10 | 10 |
| 12 | 7 | 7 | 9 10 | 9 10 |
| 13 | 7 | 7 | 9 10 | 10 |
| 14 | 7 | - | 9 10 | 10 |
| 15 | - | 3 7 | - | 9 10 |
| 16 | - | 7 | 10 | 10 |
| 18 | 1 2 | 2 | 10 | 10 |

* TYPE OF COHESION

| TEST QUESTIONS | OG (1980-1982) | N | RG (1980-1982) | N |
|---|---|---|---|---|
| grammatical | | | | |
| 1-repetition | 2 18 | 2 | 2 3 4 5 | 4 |
| 2-reference | 1 2 3 4 5 9 11 18 | 8 | 2 3 4 5 10 18 | 6 |
| 3-demonstratives | 2 4 5 9 | 4 | 2 4 5 9 11 15 | 6 |
| 4-noun subst. | - | - | - | - |
| 5-verb subst. | - | - | 11 | 1 |
| 6-clause subst. | 2 4 | 2 | 2 3 4 11 | 4 |
| 7-ellipsis | 2 4 6 10 11 12 13 14 | 8 | 2 3 4 5 6 9 11 12 13 15 16 | 11 |
| 8-extra-textual | - | - | - | - |
| | total: | 24 | total: | 32 |

| | OL (1980-1982) | N | RL (1980-1982) | N |
|---|---|---|---|---|
| lexical<br>9-repetition | 1 2 3 4 5 6 9<br>12 13 14 | 10 | 2 3 4 6 9 10 12 15 | 8 |
| 10-synonyms | 2 3 4 5 6 7 9<br>10 11 12 13 14<br>16 18 | 14 | 2 3 4 5 6 7 9 10 11 12 13<br>14 15 16 18 | 15 |
| 11-superordinates | 4 5 6 | 3 | 2 3 4 5 6 | 5 |
| 12-general words | 1 2 3 4 6 | 5 | 1 2 3 4 6 | 5 |
| | total: | 32 | total: | 33 |

summary: different placement yields different type of cohesion and coherence

## TABLE 25

### MATCHING TEXT QUESTIONS WITH LEXICAL AND GRAMMATICAL ITEMS OF COHESION IN THE TEXT*

### TEXT 6 (1980, 1981, 1982)

| QUESTION | TYPE OF COHESION IN EACH TEXT VERSION (O = Original, R = Reordered) | | | |
|---|---|---|---|---|
| | OG | RG | OL | RL |
| 1 | 3 | 2 3 4 | 9 10 | 9 10 |
| 2 | 2 3 4 | 2 3 7 8 | 9 10 | 9 10 12 |
| 3 | 2 3 4 7 | 2 3 7 | 9 10 12 | 9 10 |
| 4 | 2 | 2 | 10 | 10 |
| 5 | 2 4 | 7 | - | 9 10 12 |
| 6 | 1 2 5 7 8 | 1 2 4 7 | 9 10 | 9 10 12 |
| 7 | 1 2 8 | 1 2 4 7 | 9 10 | 9 10 12 |
| 8 | 2 5 7 | - | 9 10 | 9 10 |
| 9 | 2 8 | 2 7 | 9 12 | 10 |
| 10 | 1 2 5 7 8 | 2 5 6 7 8 | 9 10 12 | 9 10 12 |
| 11 | 7 | - | 9 10 | 9 10 11 |
| 12 | 1 2 5 7 8 | 2 5 6 7 8 | 9 10 12 | 10 11 12 |
| 13 | - | - | 10 | 9 11 |
| 14 | 2 3 7 | 2 3 7 | 9 10 11 | 9 10 11 |
| 15 | 2 3 7 | 2 3 7 | 9 10 11 | 9 10 |
| 16 | 2 3 7 | 2 3 7 | 9 10 11 | 9 10 |
| 17 | 2 7 | 2 3 7 | 9 10 11 | 9 10 |
| 18 | 2 3 7 | 2 3 7 | 9 | 9 10 |

* TYPE OF COHESION

TEXT QUESTIONS

| | OG (1980-1982) | N | RG (1980-1982) | N |
|---|---|---|---|---|
| grammatical | | | | |
| 1-repetition | 6 7 10 12 | 4 | 6 7 | 2 |
| 2-reference | 2 3 4 5 6 7 8 9 10 12 14 15 16 17 18 | 15 | 1 2 3 6 7 9 10 12 14 15 16 17 18 | 14 |
| 3-demonstratives | 1 2 3 14 15 16 18 | 7 | 1 2 3 14 15 16 17 18 | 8 |
| 4-noun subst. | 2 3 5 | 3 | 1 6 7 | 3 |
| 5-verb subst. | 6 8 10 12 | 4 | 10 12 | 2 |
| 6-clause subst. | - | - | 6 7 | 2 |
| 7-ellipsis | 3 6 8 10 11 12 14 15 16 17 18 | 11 | 2 3 5 6 7 9 10 12 14 15 16 17 18 | 13 |
| 8-extra-textual | 6 7 9 10 12 | 5 | 2 10 12 | 3 |
| | total: | 49 | total: | 47 |

| | OL (1980-1982) | N | RL (1980-1982) | |
|---|---|---|---|---|
| lexical | | | | |
| 9-repetition | 1 2 3 6 7 8 10 11 12 14 15 16 17 18 | 14 | 1 2 3 5 6 7 8 10 11 13 14 15 16 17 18 | 15 |
| 10-synonyms | 1 2 3 4 6 7 8 9 10 11 12 13 14 15 16 17 | 16 | 1 2 3 4 5 6 7 8 9 10 11 12 14 15 16 17 18 | 17 |
| 11-superordinates | 14 15 16 17 | 4 | 14 15 16 18 | 4 |
| 12-general words | 3 9 10 12 | 4 | 2 5 6 7 10 12 | 6 |
| | total: | 38 | total: | 42 |

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## TABLE 26 M-C QUESTIONS WITH SIGNIFICANT DIFFERENCES

### Original vs. Reordered Versions

| | | QUESTIONS (20 in each test) | | | |
|---|---|---|---|---|---|
| F-tests | Text | original harder | reordered harder | reordered = original | no. questions (TOTAL = 120 questions) |
| | 1 | 11, 18 | 5 | 9 | |
| | 2 | 20 | - | - | |
| | 3 | 6, 8 | 1, 2, 5, 13, 14 | - | |
| | 4 | 12, 14 | 3, 5, 10, 15, 19 | 6 | |
| | 5 | 4, 13, 14, 16 | 1, 3, 6, 7, 10, 17, 20 | 2, 19 | |
| | 6 | 2 | 5, 7, 9, 15 | - | 38 questions<br>(32%) |
| t-tests | 1 | 5, 11, 12, 15 | - | - | |
| | 2 | - | - | - | |
| | 3 | - | 1, 2, 3, 13, 14, 19 | - | |
| | 4 | 16 | 3 | - | |
| | 5 | 16 | 1, 7, 9, 10, 11 | - | |
| | 6 | 2 | 1, 3, 7, 11, 15, 20 | - | 25 questions<br>(21%) |

### Grammatical vs. Lexical Versions

| F-tests | Text | lexical harder | grammatical harder | reordered = original | |
|---|---|---|---|---|---|
| | 1 | 5, 16 | 11 | - | |
| | 2 | - | - | - | |
| | 3 | 2 | 1, 4, 13, 14 | - | |
| | 4 | 5, 6 | 2, 3, 10, 11 | - | |
| | 5 | - | 3, 4, 6, 13, 14, 17, 19, 20 | 2 | |
| | 6 | 5 | 13 | - | 25 questions<br>(21%) |
| t-tests | 1 | - | 8 | - | |
| | 2 | - | 7 | - | |
| | 3 | - | 3, 16, 18 | - | |
| | 4 | - | 10 | - | |
| | 5 | - | - | - | |
| | 6 | - | 13 | - | 7 questions<br>(6%) |

APPENDIX C

TABLE 27

## EASINESS INDICES TEST 1 (1978 - 1980)

R = Reordered Coherence
0 = Original Coherence

| Question | Grammatical Cohesion | | | Lexical Cohesion | | | Original Cohesion |
|---|---|---|---|---|---|---|---|
| | 1978 | 1979 | 1980 | 1978 | 1979 | 1980 | 1978 |
| | 0 | 0 | R | 0 | 0 | R | 0 |
| 1- | 70 | 79 | 89 | 100 | 75 | 61 | not done |
| 2- | 96 | 94 | 90 | 100 | 90 | 86 | |
| 3- | 92 | 79 | 90 | 100 | 87 | 84 | |
| 4- | 67 | 48 | 72 | 75 | 60 | 63 | |
| 5- | 50 | 51 | 80 | 50 | 45 | 75 | |
| 6- | 71 | 65 | 81 | 50 | 60 | 63 | |
| 7- | 71 | 51 | 63 | 87 | 63 | 56 | |
| 8- | 64 | 77 | 81 | 87 | 93 | 92 | |
| 9- | 100 | 88 | 85 | 100 | 90 | 91 | |
| 10- | 71 | 79 | 91 | 100 | 87 | 91 | |
| 11- | 14 | 5 | 36 | 12 | 12 | 47 | |
| 12- | 85 | 81 | 93 | 87 | 87 | 92 | |
| 13- | 14 | 26 | 35 | 37 | 15 | 29 | |
| 14- | 71 | 71 | 75 | 100 | 72 | 79 | |
| 15- | 50 | 39 | 57 | 37 | 39 | 65 | |
| 16- | 78 | 74 | 79 | 75 | 72 | 75 | |
| 17- | 85 | 77 | 82 | 100 | 75 | 93 | |
| 18- | 89 | 57 | 65 | 75 | 51 | 67 | |
| 19- | 71 | 59 | 67 | 100 | 57 | 72 | |
| 20- | 51 | 54 | 41 | 62 | 45 | 44 | |
| Number of students: | 28 | 35 | 91 | 8 | 33 | 93 | |

TABLE 28

EASINESS INDICES TEST 2 (1978 - 1980)

O = Original Coherence
R = Reordered Coherence

| Quest. | Grammatical Cohesion | | | Lexical Cohesion | | | Original Cohesion |
|---|---|---|---|---|---|---|---|
| | 1978 | 1979 | 1980 | 1978 | 1979 | 1980 | 1978 |
| | O | O | R | O | O | R | O |
| 1- | 65 | 86 | 72 | 80 | 76 | 72 | 79 |
| 2- | 45 | 58 | 55 | 67 | 48 | 55 | 46 |
| 3- | 79 | 94 | 93 | 91 | 92 | 95 | 87 |
| 4- | 65 | 85 | 86 | 80 | 82 | 66 | 74 |
| 5- | 72 | 83 | 75 | 83 | 78 | 67 | 51 |
| 6- | 84 | 87 | 93 | 75 | 88 | 77 | 74 |
| 7- | 31 | 33 | 60 | 64 | 47 | 62 | 38 |
| 8- | 50 | 66 | 69 | 67 | 64 | 62 | 58 |
| 9- | (81) | 85 | (98) | (87) | 80 | (92) | (97) |
| 10- | 68 | 58 | 82 | 71 | 73 | 79 | 87 |
| 11- | 75 | 79 | 79 | 92 | 77 | 80 | 82 |
| 12- | (90) | 84 | (98) | (91) | 73 | (96) | (94) |
| 13- | 46 | 62 | 61 | 39 | 47 | 62 | 42 |
| 14- | 75 | 80 | 86 | 75 | 69 | 66 | 76 |
| 15- | 67 | 66 | 75 | 62 | 66 | 67 | 76 |
| 16- | 45 | 62 | 92 | 55 | 61 | 86 | 61 |
| 17- | 76 | 84 | 69 | 87 | 82 | 68 | 82 |
| 18- | 67 | 63 | 53 | 71 | 66 | 63 | 58 |
| 19- | 70 | 55 | 34 | 51 | 46 | 26 | 51 |
| 20- | 40 | 78 | 52 | 50 | 74 | 53 | 64 |
| Number of students: | 45 | 90 | 89 | 56 | 85 | 112 | 39 |

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EASINESS INDICES TEST 3 (1978 - 1980)

0 = Original Coherence
R = Reordered Coherence

| Quest. | Grammatical Cohesion | | | Lexical Cohesion | | | Original Cohesion |
|---|---|---|---|---|---|---|---|
| | 1978 | 1979 | 1980 | 1978 | 1979 | 1980 | 1978 |
| . | 0 | 0 | R | 0 | 0 | R | 0 |
| 1- | 45 | 51 | 31 | 50 | 54 | 33 | 53 |
| 2- | (95) | 94 | 24 | (97) | 96 | 20 | (100) |
| 3- | 53 | 43 | 51 | 78 | 82 | 64 | 76 |
| 4- | 54 | 55 | 65 | 59 | 64 | 75 | 84 |
| 5- | 27 | 35 | 32 | 64 | 54 | 44 | 84 |
| 6- | (81) | 66 | (83) | (85) | 73 | (81) | (84) |
| 7- | 84 | 79 | 86 | 87 | 88 | 85 | 84 |
| 8- | 90 | 79 | 88 | 91 | 79 | 95 | 84 |
| 9- | (45) | 59 | (21) | (60) | 65 | (26) | (38) |
| 10- | 75 | 68 | 68 | 61 | 70 | 65 | 53 |
| 11- | 27 | 39 | 36 | 24 | 55 | 34 | 38 |
| 12- | 72 | 76 | 72 | 80 | 80 | 74 | 53 |
| 13- | 60 | 69 | 41 | 63 | 69 | 50 | 92 |
| 14- | 45 | 55 | 26 | 56 | 60 | 28 | 53 |
| 15- | 84 | 74 | 69 | 73 | 82 | 46 | 84 |
| 16- | 27 | 19 | 34 | 40 | 41 | 46 | 30 |
| 17- | 58 | 55 | 71 | 58 | 68 | 65 | 76 |
| 18- | 46 | 48 | 52 | 58 | 60 | 53 | 69 |
| 19- | 83 | 83 | 79 | 85 | 84 | 73 | 92 |
| 20- | 78 | 84 | 85 | 90 | 69 | 84 | 84 |
| Number of students: | 66 | 92 | 86 | 132 | 130 | 88 | 13 |

APPENDIX C

## TABLE 30

## EASINESS INDICES TEST 1 (1978 - 1980)

O = Original Coherence
R = Reordered Coherence

| Question | Grammatical Cohesion | | | Lexical Cohesion | | | Original Cohesion |
|---|---|---|---|---|---|---|---|
| | 1978<br>O | 1979<br>O | 1980<br>R | 1978<br>O | 1979<br>O | 1980<br>R | 1978<br>O |
| 1- | 98 | 80 | 91 | 97 | 89 | 86 | 83 |
| 2- | 68 | 79 | 81 | 78 | 87 | 92 | 67 |
| 3- | (66) | 53 | 27 | (66) | 63 | 27 | (51) |
| 4- | 88 | 72 | 92 | 88 | 81 | 87 | 79 |
| 5- | 92 | 33 | 21 | 97 | 13 | 18 | 77 |
| 6- | (92) | 20 | 15 | (90) | 14 | 19 | (91) |
| 7- | 70 | 64 | 84 | 83 | 82 | 78 | 71 |
| 8- | 75 | 67 | 68 | 83 | 66 | 68 | 75 |
| 9- | 48 | 50 | 59 | 47 | 40 | 48 | 37 |
| 10- | (28) | 80 | 84 | (35) | 92 | 92 | (53) |
| 11- | 50 | 38 | 58 | 69 | 48 | 68 | 45 |
| 12- | (48) | 41 | 62 | (47) | 46 | 56 | (47) |
| 13- | (77) | 56 | 63 | (64) | 55 | 54 | (69) |
| 14- | (57) | 31 | 31 | (66) | 26 | 41 | (53) |
| 15- | 83 | 48 | 51 | 80 | 62 | 50 | 83 |
| 16- | 48 | 52 | 68 | 28 | 51 | 70 | 61 |
| 17- | (41) | 57 | 45 | (38) | 44 | 36 | (39) |
| 18- | 43 | 45 | 82 | 28 | 41 | 43 | 33 |
| 19- | 70 | 55 | 55 | 78 | 51 | 51 | 65 |
| 20- | 37 | 54 | 52 | 66 | 51 | 54 | 57 |
| Number of students: | 54 | 162 | 85 | 42 | 129 | 96 | 50 |

BEST COPY AVAILABLE

EASINESS INDICES TEST 5 (1980 - 1982)

R = Reordered Coherence
O = Original Coherence

| Question | Grammatical Cohesion | | | | | | Lexical Cohesion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | | 1981 | | 1982 | | 1980 | | 1981 | | 1982 | |
| | O | R | O | R | O | R | O | R | O | R | O | R |
| 1 - | 77 | 63 | 66 | 43 | 79 | 39 | 62 | 64 | 66 | 45 | 77 | 30 |
| 2 - | 45 | 37 | 71 | 79 | 87 | 69 | 48 | 48 | 69 | 83 | 66 | 71 |
| 3 - | 85 | 86 | 72 | 61 | 73 | 65 | 88 | 94 | 80 | 71 | 66 | 61 |
| 4 - | 47 | 54 | 56 | 64 | 51 | 68 | 53 | 57 | 63 | 66 | 66 | 72 |
| 5 - | 95 | 96 | 88 | 85 | 95 | 86 | 90 | 94 | 94 | 83 | 96 | 95 |
| 6 - | 30 | 13 | 73 | 74 | 69 | 52 | 19 | 11 | 58 | 65 | 83 | 60 |
| 7 - | 48 | 21 | 36 | 38 | 44 | 30 | 37 | 29 | 63 | 35 | 44 | 28 |
| 8 - | 51 | 65 | 34 | 68 | 67 | 56 | 45 | 52 | 36 | 69 | 48 | 47 |
| 9 - | 58 | 32 | 56 | 23 | 53 | 22 | 48 | 35 | 22 | 22 | 40 | 39 |
| 10 - | 77 | 43 | 60 | 35 | 75 | 28 | 50 | 44 | 54 | 33 | 48 | 37 |
| 11 - | 73 | 55 | 71 | 68 | 73 | 44 | 60 | 58 | 66 | 53 | 62 | 57 |
| 12 - | 14 | 24 | 26 | 28 | 33 | 14 | 16 | 41 | 30 | 51 | 25 | 45 |
| 13 - | 40 | 50 | 27 | 13 | 25 | 18 | 33 | 47 | 30 | 31 | 22 | 32 |
| 14 - | 34 | 19 | 44 | 55 | 60 | 50 | 26 | 32 | 38 | 57 | 55 | 60 |
| 15 - | 67 | 53 | 32 | 46 | 54 | 31 | 56 | 54 | 47 | 48 | 29 | 46 |
| 16 - | 39 | 50 | 31 | 58 | 52 | 52 | 49 | 51 | 42 | 56 | 37 | 63 |
| 17 - | 94 | 84 | 53 | 68 | 60 | 50 | 93 | 91 | 65 | 69 | 81 | 54 |
| 18 - | 68 | 72 | 61 | 43 | 72 | 42 | 54 | 64 | 57 | 55 | 37 | 41 |
| 19 - | 54 | 45 | 59 | 64 | 68 | 55 | 44 | 46 | 61 | 68 | 66 | 73 |
| 20 - | 48 | 36 | 64 | 56 | 89 | 79 | 43 | 32 | 77 | 43 | 77 | 55 |
| Number of students: | 96 | 87 | 114 | 67 | 50 | 24 | 62 | 86 | 36 | 92 | 28 | 64 |

## TABLE 32

EASINESS INDICES TEST 6 (1980 - 1982)

R = Reordered Coherence
O = Original Coherence

| Question | Grammatical Cohesion | | | | | | Lexical Cohesion | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | | 1981 | | 1982 | | 1980 | | 1981 | | 1982 | |
| | O | R | O | R | O | R | O | R | O | R | O | R |
| 1 - | 79 | 33 | 53 | 69 | 71 | 53 | 73 | 20 | 69 | 60 | 58 | 44 |
| 2 - | 34 | 40 | 22 | 60 | 9 | 44 | 34 | 59 | 17 | 51 | 17 | 44 |
| 3 - | 48 | 37 | 48 | 46 | 44 | 27 | 51 | 49 | 45 | 33 | 59 | 38 |
| 4 - | 49 | 49 | 67 | 71 | 80 | 36 | 36 | 28 | 63 | 50 | 58 | 27 |
| 5 - | 51 | 25 | 68 | 72 | 84 | 66 | 53 | 33 | 73 | 66 | 73 | 56 |
| 6 - | 64 | 45 | 48 | 61 | 41 | 44 | 48 | 25 | 45 | 58 | 48 | 29 |
| 7 - | 75 | 55 | 60 | 48 | 69 | 32 | 69 | 61 | 59 | 40 | 62 | 22 |
| 8 - | 56 | 51 | 52 | 64 | 55 | 45 | 52 | 58 | 45 | 56 | 59 | 33 |
| 9 - | 79 | 82 | 76 | 78 | 71 | 64 | 80 | 66 | 81 | 69 | 71 | 66 |
| 10 - | 75 | 67 | 44 | 68 | 46 | 52 | 62 | 61 | 43 | 56 | 52 | 55 |
| 11 - | 65 | 60 | 59 | 47 | 64 | 47 | 48 | 56 | 63 | 49 | 58 | 38 |
| 12 - | 67 | 72 | 50 | 73 | 63 | 59 | 58 | 83 | 63 | 58 | 66 | 72 |
| 13 - | 54 | 49 | 34 | 60 | 40 | 35 | 60 | 75 | 65 | 63 | 51 | 72 |
| 14 - | 58 | 72 | 57 | 58 | 40 | 52 | 49 | 59 | 43 | 63 | 59 | 44 |
| 15 - | 50 | 45 | 40 | 26 | 48 | 28 | 47 | 39 | 51 | 26 | 33 | 33 |
| 16 - | 63 | 74 | 46 | 75 | 57 | 49 | 63 | 70 | 59 | 82 | 58 | 50 |
| 17 - | 61 | 61 | 28 | 50 | 54 | 38 | 54 | 67 | 59 | 55 | 61 | 27 |
| 18 - | 52 | 66 | 43 | 53 | 40 | 62 | 67 | 41 | 47 | 50 | 68 | 61 |
| 19 - | 42 | 23 | 26 | 32 | 40 | 27 | 42 | 39 | 27 | 35 | 50 | 25 |
| 20 - | 48 | 22 | 37 | 41 | 36 | 32 | 53 | 41 | 39 | 34 | 50 | 12 |
| Number of students: | 88 | 56 | 89 | 89 | 53 | 60 | 69 | 55 | 50 | 94 | 47 | 19 |

TABLE 33

Percentage of Concurrence Between Researcher and Raters: Test 2, OG and RG Versions

| % Concurrence Between Researcher and Raters | Number of Items in each version | | | % Items in each version | | |
|---|---|---|---|---|---|---|
| | OG | RG | all | OG | RG | all |
| 100% | 8 | 10 | 18 | 22% | 28% | 50% |
| 75% | 1 | - | 1 | 3% | - | 3% |
| 67% | - | 3 | 3 | - | 8% | 8% |
| 50% | 7 | - | 7 | 18% | - | 18% |
| 33% | - | 1 | 1 | - | 3% | 3% |
| 25% | - | - | - | - | - | - |
| 0% | 2 | 4 | 6 | 6% | 12% | 18% |
| | 18 | 18 | 36 | 49% | 51% | 100% |

Mean = 68%

Median = 100%

Q = (40%, 100%)

Number of Raters = 7 (native English speakers = 2, non-native = 5)

Number of Questions = 36 (OG = 18, RG = 18)

Number of Items of Cohesion = 8 (Halliday and Hasan 1976)

Values of chi-square test of goodness of fit and Kramer's C

| | ORIGINAL (OG) | | | REORDERED (RG) | | |
|---|---|---|---|---|---|---|
| | non-native | native | all | non-native | native | all |
| chi-square | 6.56 | 1.5 | 9.75 | 6.25 | 1.67 | 8.11 |
| Kramer's C | .33 | .28 | .34 | .38 | .29 | .36 |
| p * | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. |

*n.s. = not significant

נספח ג׳      טבלה 26      כ״ח

## שאלות הרב-ברירה בעלות הבדלים מובהקים

### הגירסאות המקוריות לעומת הגירסאות המסודרות מחדש

| מס' השאלות סה"כ = | מסודרת מחדש = מקוריות | שאלות (20 בכל מבחן) המסודרות מחדש קשה יותר | המקורית קשה יותר | טקסט | מבחני - F |
|---|---|---|---|---|---|
| 120 שאלות | 9 | 5 | 11, 18 | 1 | |
| | - | - | 20 | 2 | |
| | - | 1, 2, 5, 13, 14 | 6, 8 | 3 | |
| | 6 | 3, 5, 10, 15, 19 | 12, 14 | 4 | |
| 38 שאלות | 2, 19 | 1, 3, 6, 7, 10, 17, 20 | 4, 13, 14, 16 | 5 | |
| (32%) | - | 5, 7, 9, 15 | 2 | 6 | |
| | | | | | מבחני - E |
| | - | - | 5, 11, 12, 15 | 1 | |
| | - | - | - | 2 | |
| | - | 1, 2, 3, 13, 14, 19 | - | 3 | |
| | - | 3 | 16 | 4 | |
| 25 שאלות | - | 1, 7, 9, 10, 11 | 16 | 5 | |
| (21%) | - | 1, 3, 7, 11, 15, 20 | 2 | 6 | |

### הגירסאות המקוריות לעומת הגירסאות הלקסיקאליות

| | מסודרת מחדש = מקורית | הדקדוקית קשה יותר | הלקסיקאלית קשה יותר | טקסט | מבחני - F |
|---|---|---|---|---|---|
| | - | 11 | 5, 16 | 1 | |
| | - | - | - | 2 | |
| | - | 1, 4, 13, 14 | 2 | 3 | |
| | - | 2, 3, 10, 11 | 5, 6 | 4 | |
| 25 שאלות | 2 | 3, 4, 6, 13, 14, 17, 19, 20 | - | 5 | |
| (21%) | - | 13 | 5 | 6 | |
| | | | | | מבחני - E |
| | - | 8 | - | 1 | |
| | - | 7 | - | 2 | |
| | - | 3, 16, 18 | - | 3 | |
| | - | 10 | - | 4 | |
| 7 שאלות | - | - | - | 5 | |
| (6%) | - | 13 | - | 6 | |

**נספח ג'** **טבלה 21**

## התאמת שאלות המבחן לפריטי קישוריות לקסיקאלית ודקדוקית בטקסט*

### מבחן מס' 2

ח = מסודר מחדש, מ = מקור) **סוג הקישוריות בכל גירסה של מבחן** **שאלה**
ד = דיקדוקית , ל = לקסיקאלית)

| ח"ל (1980) | מ"ל (1978-1979) | ח"ד (1980) | מ"ד (1978-1979) | שאלה |
|---|---|---|---|---|
| 9,10 | 9, 10 | 3 | 2 | 1 |
| 10 | 9, 10, 11 | 3 | 4 | 2 |
| 9, 10, 12 | 9, 10, 11 | 1 | 1, 4, 7 | 5 |
| 10, 12 | 11 | 7 | 1, 7 | 6 |
| 9, 11, 12 | 9, 11 | 1 | 1, 4 | 7 |
| 11 | 9, 10, 11 | 1 | 2 | 8 |
| 10 | 9, 10 | 2, 5 | 2, 5 | 10 |
| 9, 10 | 9, 10 | 3, 7 | 3, 5, 6 | 11 |
| 9, 10 | 9, 10 | 3 | 2, 3, 4 | 16 |
| 9, 12 | 9, 10 | 1 | 2, 3, 4 | 17 |

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**סוג הקישוריות***

**שאלות המבחן**

| מס' | ח"ד (1980) | מס' | מ"ד (1978-1979) | |
|---|---|---|---|---|
| 4 | 5, 7, 8, 17 | 3 | 5, 6, 7 | 1-חזרה דקדוקית |
| 1 | 10 | 5 | 1, 8, 10, 16, 17 | 2-איזכור |
| 4 | 1, 2, 11, 16 | 3 | 11, 16, 17 | 3-כינוי רומז |
| - | - | 6 | 2, 4, 5, 7, 16, 17 | 4-המרת שע' |
| 1 | 10 | 2 | 10, 11 | 5-המרת פועל |
| - | - | 1 | 11 | 6-המרת פסוקית |
| 2 | 6, 11 | 2 | 5, 6 | 7-השמטה |
| - | - | - | - | 8-חוץ-טקסטואלית |
| 12 | סה"כ: | 22 | סה"כ: | |

| מס' | ח"ל (1980) | מס' | מ"ל (1978-1979) | |
|---|---|---|---|---|
| 5 | 5, 7, 11, 16, 17 | 9 | 1, 2, 5, 7, 8, 10, 11, 16, 17 | 9-חזרה לקסיקאלית |
| 7 | 1, 2, 5, 6, 10, 11, 16 | 8 | 1, 2, 5, 8, 10, 11, 16, 17 | 10-מלים נרדפות |
| 2 | 7, 8 | 5 | 2, 5, 6, 7, 8 | 11-שמוץ קיבוץ |
| 4 | 5, 6, 7, 17 | - | - | 12-מלים כלליות |
| 18 | סה"כ: | 22 | סה"כ: | |

**סיכום:**

ד/ל = אותן שאלות
מ/ח = שאלות שונות, מספר השאלות בסה"כ שונה (פחות בנוסח המסודר מחדש)

**השלכות:** שינוי סדר המשפטים משנה את סוג הקישוריות, וכן גם את סוג הלכידות.

**נספח ג'**

## לכידות -- תוצאות שאלות רב-ברירה לגבי גירסאות מקוריות ומסודרות מחדש של טקסט

מ = מקורית
ח = מסודרת מחדש

ב.מ. = בלתי מובהק

| שאלה * | רמת מובהקות | (ד"ח) | ערך-F | רמת מובהקות | (ד"ח) | ערך-t | ס"ת | (סטודנטים) ממוצע | מס' | לכידות | מבחנים |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ב.מ. | (440) | 1.32 | ב.מ. | (439) | 1.15 | 20.3 | 65.2 | 289 | מ | אמצע הסמסטר 1 - 4 |
| | | | | | | | 20.2 | 62.9 | 152 | ח | |
| | .05 | (516) | 4.70 | ב.מ. | (515) | 2.17 | 17.1 | 54.3 | 278 | מ | 5 - 6 |
| | | | | | | | 18.0 | 51.0 | 239 | ח | |
| | .001 | (957) | 10.95 | .001 | (956) | 3.31 | 19.6 | 59.9 | 567 | מ | 1 - 6 |
| | | | | | | | 19.7 | 55.6 | 391 | ח | |
| | | | | ב.מ. | (22) | .83 | | | | מ/ח | 1 - 4 |
| | | | | .05 | (22) | 2.37 | | | | | 5 - 6 |
| | ב.מ. | (157) | 1.77 | | | | | | | מ/ח | (1980) |
| | ב.מ. | (199) | 1.50 | | | | | | | מ/ח | (1981) |
| | .0005 | (158) | 13.54 | | | | | | | מ/ח | (1982) |
| | ב.מ. | (309) | 1.92 | | | | | | | מ/ח | 1 - 6 (1980) |
| 5, 9, 11, 18 | ב.מ. | (120) | .71 | ב.מ. | (119) | .84 | 24.0 | 67.8 | 81 | מ | 1 |
| | | | | | | | 17.7 | 71.4 | 40 | ח | |
| 20 | ב.מ. | (107) | 1.20 | ב.מ. | (106) | 1.10 | 15.0 | 68.0 | 72 | מ | 2 |
| | | | | | | | 15.0 | 64.6 | 36 | ח | |
| 1, 2, 6, 8, 9, 13, 14 | ג.מ. | (105) | 3.27 | ג.מ. | (104) | 1.81 | 18.7 | 64.1 | 70 | מ | 3 |
| | | | | | | | 21.5 | 56.8 | 36 | ח | |
| 3, 5, 6, 10, 12, 14, 15, 19 | ג.מ. | (105) | .20 | ג.מ. | (104) | .45 | 21.5 | 60.1 | 66 | מ | 4 |
| | | | | | | | 22.7 | 58.2 | 40 | ח | |
| 1, 2, 3, 4, 6, 7, 10, 13, 14, 16, 17, 19, 20 | ב.מ. | (238) | 3.04 | ג.מ. | (237) | 1.74 | 19.9 | 56.4 | 119 | מ | 5 |
| | | | | | | | 19.5 | 51.9 | 120 | ח | |
| 2, 5, 7, 9, 15 | ג.מ. | (277) | 2.23 | ג.מ. | (276) | 1.49 | 14.5 | 52.8 | 159 | מ | 6 |
| | | | | | | | 16.2 | 50.0 | 119 | ח | |

38 שאלות

* שאלות שבהן היה מבחן ה- F מובהק (רמת מובהקות = .05).

**טבלה 18**

## תוצאות שאלות רב-ברירה לטקסטים ששוכתבו לצורך קישוריות דקדוקית ולקסיקאלית

ד = דקדוקי
ל = לקסיקאלי

ב.מ. = בלתי מובהק

|  | רמת מובהקות | (ד"ח) | ערך-F | רמת מובהקות | (ד"ח) | ערך-t | (סטודנטים) ס"ת | (סטודנטים) ממוצע | (סטודנטים) מס' | קישוריות | מבחנים |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | ב.מ. | (440) | 2.40 | ב.מ. | (439) | 1.55 | 19.9 | 62.9 | 221 | ד | אמצע הסמסטר 1 - 4 |
|  |  |  |  |  |  |  | 20.7 | 65.9 | 220 | ל |  |
|  | ב.מ. | (516) | .00 | ב.מ. | (515) | .02 | 17.2 | 52.8 | 258 | ד | 5 - 6 |
|  |  |  |  |  |  |  | 18.0 | 52.8 | 259 | ל |  |
|  | ב.מ. | (957) | 1.15 | ב.מ. | (956) | 1.07 | 19.5 | 57.4 | 479 | ד | 1 - 6 |
|  |  |  |  |  |  |  | 20.0 | 58.8 | 479 | ל |  |
|  |  |  |  | ב.מ. | (22) | 1.18 |  |  |  | ד/ל | 1 - 4 |
|  | .05 | (135) | 3.78 |  |  |  |  |  |  | ד/ל | 1 - 4 (1978) |
|  | ב.מ. | (152) | .32 |  |  |  |  |  |  | ד/ל | (1979) |
|  | ב.מ. | (151) | .04 |  |  |  |  |  |  | ד/ל | (1980) |
|  |  |  |  | ב.מ. | (22) | .82 |  |  |  | ד/ל | 5 - 6 |
|  | ב.מ. | (157) | .35 |  |  |  |  |  |  | ד/ל | 5 - 6 (1980) |
|  | ב.מ. | (199) | .56 |  |  |  |  |  |  | ד/ל | (1981) |
|  | ב.מ. | (158) | .01 |  |  |  |  |  |  | ד/ל | (1982) |
|  | ב.מ. | (309) | .06 |  |  |  |  |  |  | ד/ל | 1 - 6 (1980) |
| * שאלה |  |  |  |  |  |  |  |  |  |  |  |
| 5, 11, 16 | ב.מ. | (120) | .49 | ב.מ. | (119) | .70 | 21.0 | 67.6 | 61 | ד | 1 |
|  |  |  |  |  |  |  | 23.3 | 70.4 | 60 | ל |  |
| — | ב.מ. | (107) | 1.39 | ב.מ. | (106) | 1.18 | 15.6 | 65.1 | 54 | ד | 2 |
|  |  |  |  |  |  |  | 14.4 | 68.5 | 54 | ל |  |
| 1, 2, 4, 13, 14 | ב.מ. | (105) | 1.91 | ב.מ. | (104) | 1.40 | 21.0 | 58.9 | 53 | ד | 3 |
|  |  |  |  |  |  |  | 18.6 | 64.3 | 53 | ל |  |
| 2, 3, 5, 6 10, 11 | ב.מ. | (105) | .02 | ב.מ. | (104) | .12 | 23.5 | 59.7 | 53 | ד | 4 |
|  |  |  |  |  |  |  | 20.4 | 59.1 | 53 | ל |  |
| 2, 3, 4, 6, 13, 14, 17, 19, 20 | ב.מ. | (238) | .03 | ב.מ. | (237) | .16 | 20.4 | 54.3 | 120 | ד | 5 |
|  |  |  |  |  |  |  | 19.3 | 53.9 | 119 | ל |  |
| 5, 13 | ב.מ. | (277) | .05 | ב.מ. | (276) | .23 | 15.5 | 51.4 | 138 | ד | 6 |
|  |  |  |  |  |  |  | 15.2 | 51.8 | 140 | ל |  |
| 25 שאלות |  |  |  |  |  |  |  |  |  |  |  |

* שאלות שבהן היה מבחן ה- F מובהק (רמת מובהקות = .05).

## נספח ג'

## תוצאות מבחני הבנה רב-ברירה 1-4 (1978-1980) - קישוריות טבלה 15

מ - גירסה מקורית
ד - גירסה דקדוקית
ל - גירסה לקסיקאלית

**הגירסה המקורית לעומת המשוכתבת לצורך קישוריות**

| דרגות החופש | * ערך t (מדרוג) | | | מבחן |
|---|---|---|---|---|
| | | 40 | מס' סטודנטים | 2 מ |
| | | 68.85 | ממוצע (%) | |
| | | 17.53 | סטית תקן | |
| 19 | 2.03 | 224 | מס' | 2 ד |
| | | 65.15 | ממוצע (%) | |
| | | 15.33 | סטית תקן | |
| 19 | .16 | 253 | מס' | 2 ל |
| | | 68.55 | ממוצע (%) | |
| | | 14.62 | סטית תקן | |
| | | 29 | מס' | 3 מ |
| | | 67.25 | ממוצע (%) | |
| | | 17.94 | סטית תקן | |
| 19 | 1.12 | 244 | מס' | 3 ד |
| | | 59.61 | ממוצע (%) | |
| | | 21.57 | סטית תקן | |
| 19 | .12 | 350 | מס' | 3 ל |
| | | 64.87 | ממוצע (%) | |
| | | 18.34 | סטית תקן | |
| | | 66 | מס' | 4 מ |
| | | 59.55 | ממוצע (%) | |
| | | 16.28 | סטית תקן | |
| 19 | 1.66 | 201 | מס' | 4 ד |
| | | 59.05 | ממוצע (%) | |
| | | 20.09 | סטית תקן | |
| 19 | 1.42 | 267 | מס' | 4 ל |
| | | 59.47 | ממוצע (%) | |
| | | 22.78 | סטית תקן | |

לגבי כל 4 הטקסטים: מ לעומת ד : (מזווג) = (13) .7 , ב.מ.; = (3) .16, ב.מ.
מ לעומת ל : (מזווג) = (13) .15 , ב.מ.; = (3) .39, ב.מ.

* כל הערכים בלתי מובהקים.

* טבלה 14

## דירוג מצייני הקלות של שאלות על חלקי טקסט הכוללים פריטים קישוריים (טקסטים 1 - 4)

| מס' הסטודנטים | מס' השאלות | קישוריות לקסיקאלית<br>מציין הקלות הממוצע | המאפיין | קישוריות דקדוקית<br>מס' הסטודנטים | מס' השאלות | מציין הקלות הממוצע | המאפיין |
|---|---|---|---|---|---|---|---|
| | | | | 923 | 20 | 67.88 % | 8 - |
| 1004 | 91 | 67.69 % | 10 - | | | | |
| | 95 | 66.31 % | 9 - | | | | |
| | 19 | 65.96 % | 12 - | | | | |
| | | | | | 28 | 65.65 % | 4 - |
| | | | | | 63 | 65.56 % | 3 - |
| | | | | | 68 | 64.01 % | 2 - |
| | 43 | 60.45 % | 11 - | | | | |
| | | | | | 61 | 61.40 % | 1 - |
| | | | | | 29 | 59.63 % | 7 - |
| | | | | | 10 | 50.45 % | 5 - |
| | | | | | 4 | 47.98 % | 6 - |
| | 248 : סה"כ | | | | 283 | סה"כ: | |

* מפתח: קישוריות דקדוקית

1 - חזרה
2 - איזכור
3 - הכינוי הרומז
4 - המרת ש"ע
5 - המרת פועל
6 - המרה פסוקית
7 - השמטה
8 - חוץ-טקסטואלי

קישוריות לקסיקאלית

9 - חזרה לקסיקאלית
10 - מילה נרדפת
11 - מילה קיבוצית
12 - מילה כללית

### (טקסטים 5-6)

| מס' הסטודנטים | מס' השאלות | קישוריות לקסיקאלית<br>מציין הקלות הממוצע | המאפיין | קישוריות דקדוקית<br>מס' הסטודנטים | מס' השאלות | מציין הקלות הממוצע | המאפיין |
|---|---|---|---|---|---|---|---|
| | | | | 873 | 36 | 60.61 % | 1 - |
| | | | | | 21 | 60.15 % | 5 - |
| | | | | | 24 | 59.31 % | 8 - |
| 702 | 48 | 59.12 % | 11 - | | | | |
| | 60 | 58.96 % | 12 - | | | | |
| | | | | | 129 | 56.98 % | 2 - |
| | | | | | 24 | 56.94 % | 6 - |
| | 186 | 52.77 % | 10 - | | | | |
| | | | | | 129 | 52.50 % | 7 - |
| | 141 | 52.30 % | 9 - | | 75 | 52.33 % | 3 - |
| | | | | | 18 | 47.72 % | 4 - |
| | 435 : סה"כ | | | | 456 | : סה"כ | |

## טבלה 6 נספח ג'

### מבחן 2 -- קוהרנסיות: גירסה מסודרת מחדש

| שאלה | מושגים ברמת התיפקוד | הכוח האילוקוציוני ברמת התיפקוד | תיפקוד המשפט | (מקורי) משפט/ | פיסקה |
|---|---|---|---|---|---|
| | סכנה של גידול האוכלוסין | הצגת הבעיה | עובדה | 1 (7) | 1 |
| | | | ניגוד | 2 (9) | |
| 1 | | | דעת המחבר | 3 (3) | |
| 2 | | | ",סיבה/תוצאה | 4 (8) | |
| 3 | | | מסקנה,פתרון | 5 (10) | |
| 4 | לבטי הממשלות באשר לשימוש בכפיה | דיון בפתרון | בעיה בעלת פתרון | 6 (2) | 2 |
| 5 | | | " | 7 (18) | |
| 6 | | | " | 8 (21) | |
| | | | ניגוד, " , סיבה הוצאה | 9 (22) | |
| 7 | גידול בהכנסת המשפחה | " | הערה מנוגדת של המחבר | 10 (5) | 3 |
| | פתרון בעייתי | | שאלה | 11 (11) | |
| | | | תשובה = פתרון 1 | 12 (20) | |
| | | | פתרון 2 | 13 (19) | |
| 8 | | תוצאה | סיבה/ תוצאה פתרון 3 | 14 (16) | |
| 9, 10 | | | הסבר | 15 (17) | |
| 11 | השכלה רבה יותר לנשים | | סיבה , פתרון 4 תוצאה | 16 (13) | 4 |
| 12 | | | הרחבה | 17 (15) | |
| 13 | | | דוגמה | 18 (14) | |
| | | | הערת המחבר, מסקנה | 19 (12) | |
| | סכנה של גידול האוכלוסין | חזרה על הצגת הבעיה | קביעה כללית<br>חזרה על הקביעה | 20 (1) | 5 |
| 14 | | | הרחבה ,<br>סיבה/תוצאה | 21 (4) | |
| 15, 16, 17 | | | מסקנת המחבר,<br>חזרה על הקביעה | 22 (6) | |

שאלות כלליות :

18, 19, 20

כ א

**טבלה 6** **נספח ג'**

מבחן 2 - קוהרנטיות: (מקור)

| שאלה | מושגים ברמת הפיסקה | הכוח האילוקוציוני ברמת הפיסקה | תיפקוד המשפט | משפט | פיסקה |
|---|---|---|---|---|---|
| 1 | סכנה של גידול האוכלוסין, | הצגת הבעיה | קביעה כללית | 1 | 1 |
| 2 | | | הרחבה | 2 | |
| 3 | | | חזרה על הקביעה, | 3 | |
| 4 | אין מכירים תמיד באזהרה | | דעת המחבר<br>חזרה<br>ניגוד | 4 | |
| 5. | | | רעיון מקביל | 5 | |
| | | | חזרה, ניגוד | 6 | |
| 7 | | | השוואה, חזרה, סיכום | | |
| 8 | בעיה (המשך) | תיאור | עדות | 7 | 2 |
| | | | סיבה, תוצאה | 8 | |
| | | | עדות, ניגוד | 9 | |
| | | | מסקנה | 10 | |
| 9 | השכלה רבה יותר לנשים | פתרונות | שאלה | 11 | 3 |
| 10 | | | תשובה | 12 | |
| 11 | | | חזרה על הקביעה, תוצאה | 13 | |
| | | | דוגמא | 14 | |
| | | | תוצאה | 15 | |
| 12, | גידול בהכנת המשפחה | " | רעיון מקביל, תשובה | 16 | 4 |
| 14 | | | הרחבה | 17 | |
| 15, | לבטי הממשלות באשר לשימוש בכפיה | מסקנה | חזרה על הקביעה, תשובה | 18 | 5 |
| 17 | | | החרבה | 19 | |
| | | | ניגוד, הרחבה | 20 | |
| | | | ניגוד, הרחבה | 21 | |
| | | | מסקנה | 22 | |

שאלות כלליות:

18, 19, 20

כ

## נספח ג'

## טקסטים מדורגים על-פי נוסחת קלות הקריאה של פלש

טבלה 1

מ = גירסה מקורית

ח = גירסה מסודרת מחדש

קלות הקריאה = 206.835 - .846 wl - 1.015 sl

wl = אורך המילה

sl = אורך המשפט

### ג י ר ס ה

| גירסה לקסיקאלית | | גירסה דקדוקית | | מקור | טקסט |
|---|---|---|---|---|---|
| ח | מ | ח | מ | | |
| 47.8 | 46.9 | 52.0 | 54.5 | 52.9 | 1 |
| 46.1 | 32.5 | 56.2 | 47.7 | 43.6 | 2 |
| 57.9 | 52.0 | 46.9 | 54.5 | 57.9 | 3 |
| 54.6 | 66.4 | 59.6 | 67.2 | 59.6 | 4 |
| 49.6 | 55.4 | 70.7 | 65.6 | - | 5 |
| 40.2 | 38.5 | 53.9 | 51.2 | - | 6 |

(ככל שהמספר גבוה יותר, כן קשה הטקסט יותר)

## ה. מסקנות כלליות.

הדחף לעריכת המחקר הנוכחי יצא מתוך כיתת הוראת האנגלית כשפה זרה. רק מעט ידוע על תהליך הקריאה שמבצעים לומדי שפה זרה מתקדמים. הנחות־היסוד הנוגעות לתהליך הקריאה ששימש בסיס למחקרנו נשאבו בעיקר ממחקרים הנוגעים לדוברי שפה ילידים. נמצא שתהליכים אלה תקפים גם לגבי תלמידינו הלומדים אנגלית כשפה זרה בהתאם לתפיסתם את הטקסט כקשה.

הלכידות והקישוריות אינן רק מיבנים תיאורטיים, כי אם גורמים אינטגראליים בתהליך הקריאה. אם יהיו תלמידי אנגלית כשפה זרה ערים לדרכי פעולתן של אלה בטקסטים, יסייע להם הדבר לרכוש יתר רהיטות בקריאה.

מיגבלה נוספת היתה ההליך של הצגת שאלות הנוגעות לטקסט כדי שאלות למדוד את מידת הקושי שלו. שאלות הנוגעות למבחן מודדות את קשיי הטקסט בעקיפין בלבד - ייתכן שהסטודנטים הבינו את הטקסט, אך לא הבינו חלק מן השאלות הנוגעות לו. קושי נוסף נבע מתפוצת השאלות הנוגעות לחלקי הטקסט המשוכתבים - אם כי נעשה מאמץ ניכר לשאול שאלה אחת לפחות הנוגעת לכל חלק של הטקסט המכיל סמני קישוריות, לא נתאפשר הדבר תמיד. לעומת זאת היתה לעתים כפילות, כששאלה אחת התייחסה לחלק טקסט הכולל יותר ממאפיין קישוריות אחד. במקרה זה נסנחה השאלה פעמיים (או יותר), כלומר - פעם אחת לכל מאפיין קישוריות שנכלל בה.

### ג. יישומים אפשריים.

מתוצאות המחקר עולה, כי נוסף על אוצר-המלים, משפיעים על הבנת הניקרא גם היבטים של קישוריות הטקסט (כגון סוגים שונים של מקשרי משפטים ופיסקאות) ולכידותו (כגון מבנה פיסקה מצטברת לעומת פיסקה מנוגדת ומבנה פיסקה מעלה-מטה לעומת מטה-מעלה). כדי לחזות מראש את רמת הקושי של טקסט מסויים, על המורים ומתכנני הקורסים של אנגלית כשפה זרה לאתר מאפיינים אלה בטקסט.

נעשה שימוש באמצעים שונים ומגוונים (מבחנים, נוסחאות קריאות וחקר-השיח) כדי למדוד אותה תופעה עצמה - הבנת הניקרא. אמצעים שונים אלה הביאו לאותה מסקנה - ארגון רצף המידע משפיע על קושי הקריאה. מכאן, שמידת ההתאמה של השיטה עשויה להיות תלויה במטרתו ובדרכיו של המורה או החוקר.

### ד. הצעות למחקר נוסף.

ניתן ליישם את דגם המחקר הנוכחי לאוכלוסיות-מחקר אחרות (רמה נמוכה יותר, שפת-אם שונה), כמו גם לסוגי טקסט אחרים (סיפורת, עיתונות, טקסט מדעי).

נוסף על כך, ניתן להשתמש בטכניקות אחרות של הערכה כדי למדוד את הבנת הניקרא.

## VI. סיכום ומסקנות.

### א. סיכום הממצאים.

מחקרנו עסק בחקר הסיבות לקושי הקריאה תוך התחשבות, הן בקורא והן בטקסט, והתרכז בשני גורמים בתהליך הקריאה - יכולת הקורא/ת להבין רצפים של פרופוזיציות, דהיינו, לכידות, ומידת שליטתו/ה בסמני הקישוריות. היה צפוי שכשל באחד משני תחומים אלה יפגע בהבנת הנקרא אצל סטודנטים הלומדים אנגלית כשפה זרה ברמה המתקדמת.

ארגון רצף המידע, שהוא היבט הלכידות שבו מתמקד מחקרנו, אכן נתגלה כגורם לקושי בקריאה, והשאלה הראשונה שהציג המחקר זכתה בתשובה חיובית.

נראה שקישוריות הטקסט, שהוגדרה כקישוריות דקדוקית ולקסיקאלית, משפיעה על הלכידות, אך אינה משפיעה בהכרח על הקושי, מכאן, שהשאלה השניה שהציג המחקר זכתה בתשובה שלילית.

### ב. המיגבלות.

הניסוי היה קשה לעריכה בשל גורמים רבים ושונים - שיטת הסירוג, הליך השיכתוב, ואמצעי הבחינה והמדידה.

שיטת הסירוג נועדה מלכתחילה להיות תיאורטית ולא להיות קשורה לקושי הקריאה. על כן מתקבל על הדעת, לאור 12 קבוצות-המישנה שבקישוריות הטקסט, שכמה מהן, כגון המרת הפסוקית, תקשינה על הקריאה, בעוד כמה אחרות, כגון החזרה, תקלנה על ההבנה, כלומר - השפעת סוגים אחדים עשויה לבטל השפעת סוגים אחרים על תוצאות המבחן.

כמו-כן נוצרה חפיפה מסויימת בטקסטים המשוכתבים - כמעט אי-אפשר היה לבודד את המאפיינים באופן מוחלט כדי שבגירסה הדקדוקית, למשל, יתקיימו פריטים דקדוקיים בלבד.

לכל היותר היוו הפריטים הקישוריים רק 12% מכלל המלים בכל גירסה שהיא של טקסט, ושיעור זה עשוי היה להיות בלתי מספק כדי להביא להבדלים מובהקים מבחינה סטאטיסטית.

### 2. דירוג מאפייני הקישוריות.

כל אחת מ- 120 השאלות המתלוות לששת הטקסטים סווגה על-פי מאפיינ(י) הקישוריות הכלול(ים) בטקסט. יש להניח כי יהא על הקורא להבין פריטי קישוריות אלה בטקסט כדי לענות על השאלות.

הממוצע המשוקלל עבור כל פריט חושב בנפרד (ראה נספח ג', טבלה 14).

אם כי לא נמצא דירוג של קושי, ניתן היה לעמוד על נטיות מסויימות:

מבין כל המאפיינים נמצאה הפרת פסוקיות בקבוצת המאפיינים הקשים. לעומת זאת, היה קל יותר לקרוא חלקי טקסט המכילים חזרה לקסיקאלית או דקדוקית מאשר לקרוא חלקי טקסט אחרים.

### ג. הקישוריות כבעיה ללומדי אנגלית כשפה זרה.

פריטי הקישוריות מקלים על הקריאה משום שהם מסמנים קשרים בין המלים, אם אין הקוראים מסוגלים לפענח סמני קישוריות אלה, אין הם יכולים להשתמש בהם כעזרים או סימני-דרך בטקסט. כתוצאה מכך יכולים סמני הקישוריות אף להיות למכשול בדרך הבנתם של קוראים בלתי רהוטים את הטקסט.

זוהי בעיה ברמת המיקרו בעיקר, מכיון שרמזים הקשריים נוספים עשויים להתערב כאן ולחזק את סמן הקישוריות ברמת המאקרו. כשסמן הקישוריות מקיף את רמת הפיסקה ללא עזרת העודפות, עלול חוסר הבנת הסמן הקישורי להשפיע גם על ההבנה ברמת המאקרו.

## V. הקישוריות.

### א. סיבה לקושי בהבנת הניקרא.

קישוריות הטקסט מהווה אחד הגורמים המשפיעים על הבנת הניקרא. עם זאת, לא קל להוכיח באיזו מידה היא עשויה למנוע הבנה זו.

מתוצאות יישום נוסחת קלות הקריאה של פלש ( Flesch ) (ראה נספח ג', טבלה 1) לטקסטים 2-4 עולה כי הגירסאות המקוריות היו קלות יותר מהגירסאות ששוכתבו לצורך הקישוריות הדקדוקית או הלקסיקאלית.

עם זאת עלה מתוצאות מבחני הרב-ברירה 2-4 כי הגירסאות המקוריות הן ברמת קושי זהה לזו של הגירסאות המשוכתבות (ראה נספח ג', טבלה 15).

השיכתוב לצורך הקישוריות השפיע על אורך הטקסט - הגירסאות הדקדוקיות היו ארוכות מן הגירסאות המקוריות והלקסיקאליות בטקסטים מס. 1, 2, 3, 5, 6. הגירסה הדקדוקית הקצרה יותר, שתוכנה היה זהה, היתה דחוסה ומרוכזת יותר מיתר הגירסאות. לא ניראה שדחיסות זו משפיעה במובהק על קושי הטקסט. ממצא זה מתקבל על הדעת אם רואים טקסט או שיח כסידרת פרופוזיציות ולא כסידרת מלים. במקרה כזה משפיע הליך השיכתוב רק על ניסוח הפרופוזיציות ולא על מספרן, תוכנן או הקשרן יחסית זו לזו, ולכן לא חל בטקסטים שינוי יסודי.

### ב. קישוריות דקדוקית לעומת קישוריות לקסיקאלית.

#### 1. הליך השיכתוב.

מתוצאות השימוש בנוסחת קלות הקריאה של פלש עלה, כי הגירסאות הדקדוקיות קשות יותר מן הלקסיקאליות (מבחן ח' ברבוע לטיב ההתאמה:
חי בריבוע = 6.75, ד"ח = 1, (רמת המובהקות) ( $p < .01$ ).
עם זאת לא הראו תוצאות מבחני הרב-ברירה על הבדל מובהק כגון זה (ראה נספח ג', טבלאות 18, 26).

### ב.   פיסקאות מעלה-מטה לעומת פיסקאות מטה-מעלה.

נמצא כי מיבני מעלה-מטה (כשהרעיון המרכזי מובא בהתחלה) קלים יותר ממיבני מטה-מעלה (הפותחים ברעיונות המישניים ומגיעים בהדרגה לנקודות העיקריות).

במידגם של הפיסקאות הראשונות בכל אחד מששת הטקסטים נבדקו מיבני מעלה-מטה/מטה-מעלה.

בטקסטים מס. 1, 2, 5 ו- 6 פתחה הגירסה המקורית במיבנה מעלה-מטה, בעוד הגירסה המסודרת מחדש של אותם טקסטים פתחה במיבנה מטה-מעלה. (בטקסט מס. 3 פתחו שתי הגירסאות במיבנה מטה-מעלה, ובטקסט מס. 4 פתחו שתי הגירסאות במיבנה מעלה-מטה).

נמצא הבדל מובהק בין מיבני מעלה-מטה למיבני מטה-מעלה ($t = 2.72$ , ד"ח $= 8$ , $p < .05$).

### 2. השפעת הסידור מחדש על קישוריות הטקסט.

במרוצת המחקר התעורר הצורך להביא בחשבון את השפעת הקישוריות על תהליך סידור הטקסט מחדש. טבלה 21 המתארת את טקסט 2 (ראה נספח ג') מראה שבאותן שאלות עצמן - קיימים בגירסה המקורית מאפייני קישוריות העשויים שלא להופיע בגירסה המסודרת מחדש, ולהיפך.

### 3. השפעת הסידור מחדש על דגמי שיח-תיפקוד המשפט, רעיונות ברמת הפיסקה, הכוח האילוקוציוני.

### א. פיסקאות מצטברות לעומת פיסקאות מנוגדות.

בפיסקאות מצטברות מסבירים רעיון ונותנים דוגמאות כדי להביע השקפה מסויימת או לתאר מצב נתון. בפיסקאות מנוגדות או משוות מביעים השקפות חילופיות, משווים בין אובייקטים או מביעים הסתייגות או אי-הסכמה.

לגבי 13 מבין 120 השאלות,המהוות 11%, חל שינוי בסוג תיפקוד המשפט במרוצת תהליך הסידור מחדש. כשהושוו שלושה-עשר צמדי השאלות, ללא התייחסות לגירסת הטקסט, נמצא הבדל מובהק בין מצייני הקלות של שאלות הקשורות לפיסקאות מנוגדות ושל שאלות הקשורות לפיסקאות מצטברות. הפיסקאות המצטברות היו קלות יותר ( $t = 2.28$, ד"ח $= 12$, $p < .05$).

## ב. האירגון מחדש והקושי.

### 1. טקסטים מקוריים לעומת טקסטים משוכתבים.

בתוצאות נוסחת קלות הקריאות של פלש שיושמה לגבי המבחנים 1 - 6 לא נמצא הבדל מובהק בין הגירסאות המקוריות והגירסאות המשוכתבות (מבחן חי בריבוע לטיב התאמה: חי בריבוע = 33, רמת המובהקות = אין הבדל מובהק). (ראה נספח ג', טבלה 1).

עם זאת הראו תוצאות מבחני הקלוז כי הגירסאות המשוכתבות קשות יותר במובהק מן הגירסאות המקוריות. (F = 1.64 , 97 ל- 88= ד"ח, $p < .05$; t = 4.36 , ד"ח = 184 , $p < .0001$).

עם זאת נמצא הבדל מובהק באשר לטקסט מס. 3. נמצא הבדל מובהק בין תוצאות מבחני רב-ברירה של גירסאות מקוריות ומסודרות מחדש של שישה טקסטים. השוואה של כלל תוצאות המבחנים העלתה את הממצאים הבאים: ( F = 10.95 , ד"ח = 957, $p < .001$; t = 3.31 , ד"ח = 956, $p < .001$).

במבחני ה- F נתגלה הבדל מובהק בין מצייני הקלות של הגירסאות המקוריות והגירסאות המסודרות מחדש, לגבי 38 שאלות, המהוות 32% מכלל 120 השאלות (ראה נספח ג', טבלה 26).

ניתן להסיק מכך כי הגירסאות המסודרות מחדש היו קשות יותר מהגירסאות המקוריות של הטקסט. מכאן שהוכח שאירגון רצף המידע משפיע על קשיים בקריאה אצל לומדי שפה זרה מתקדמים בישראל.

## IV. הלכידות.

### א. עיבוד השיח.

בין החוקרים רווחות שתי דיעות שונות באשר לעיבוד השיח. לדעת תורנדייק (1979 Thorndyke ), קינץ (1977 Kintsch ), גוטבינסקי (1976 Gutwinski ), סטרנג (1972 Strang ) נוטים הקוראים מדרך-הטבע להעניק פירוש משמעותי כלשהו לסידרת פרופוזיציות נתונות, ואף לסדר את רעיונותיו של המחבר בדרכים חדשות משלהם. הקוראים משתמשים בסכימה ומשלימים את החוליות החסרות בה על-פי ציפיותיהם הנתונות מראש לגבי מבנה הטקסט.

דעה שונה, שעל מביעיה נמנים מייר (1975 Meyer ), ווידוווסון (1978 Widdowson ), קירס (1978 Kieras ), וון-דייק (1980 van Dijk), בוגרנד (1980 Beaugrande ), בייטן (1981 Baten ) ושנוץ (1983 Schnotz קובעת שהקריאות מושפעת מן הסדר שבו מתקבל המידע.

הרעיון ששני התהליכים הללו מתרחשים יחדיו הועלה בפי אדמס (1980 Adams ), ספירו (1980 Spiro), ואובל ופרנקס (1983 Auble and Franks ). ההבנה נתפסת כיחס-הגומלין בין עיבוד מלמעלה למטה מסכימה שמפעיל הקורא לבין עיבוד מלמטה למעלה על-פי תפיסות המובעות בטקסט (Auble and Franks 1983).

## ג. עיבוד הנתונים וניתוחם.

### 1. נוסחת קלות הקריאות של פלש ( Flesch ).

נוסחה זו יושמה לגבי 100 המלים הראשונות בכל אחת מגירסאות הטקסט (ראה נספח ג', טבלה 1).

### 2. תוצאות המבחנים.

במחקר הנוכחי הושוו ההבדלים בין מצייני הקלות (אחוז התשובות הנכונות) של השאלות הזהות בגירסאות הדקדוקית והלקסיקאלית של הטקסטים המקוריים והטקסטים שאורגנו מחדש.

לגבי 24 הגירסאות המשוכתבות של ששת הטקסטים המקוריים, נעשה שימוש במבחני - t ומבחני- F ( ANOVA דו-סיטרי של הדירן כפול השנה כפול סוג המבחן) כדי לחשב אם קיימים הבדלים משמעותיים בין ציוני מבחנים ממוצעים, בין מצייני קלות השאלות ותשובות לשאלות ספציפיות הקשורות ישירות לחלקים של הטקסטים המשוכתבים (ראה נספח ג', טבלאות 18, 19 ו- 26).

לגבי המבחנים 4-2 הושוו הציונים שהושגו לגבי גירסאות המבחנים המשוכתבות עם תוצאות הגירסאות המקוריות, וכן גם נערכה השוואה בין הגירסאות לבין עצמן.

נבדק הקשר בין דפוסי טיעון מסויימים בטקסט לבין הקלות או הקושי של השאלות המקבילות לחלקי-טקסט אלה (ראה נספח ג', טבלה 17).

## 2. ההליכים ששימשו לקביעת קושי הטקסט.

במחקר הנוכחי נבדקו שישה טקסטים. כל טקסט שוכתב בארבע גירסאות. שתיים מן הגירסאות נכתבו בסדר המשפטים המקורי, אך כללו בעיקר פרטים בעלי קישוריות דקדוקית או לקסיקאלית. ביתר שתי הגירסאות אורגנו המשפטים מחדש תוך שמירה על משמעותם, כשהמידע שבהם מוצג בסדר שונה. גם שתי גירסאות אלה כללו בעיקר פרטים בעלי קישוריות לקסיקאלית או דקדוקית. במבחני הרב-ברירה נחלוו אותן עשרים שאלות לכל גירסאותיו של טקסט מסויים.

במבחני תקלוז מחקה החוקרת אותן מלים עצמן, הן בגירסאות הטקסט המקוריות והן באלה שסידרן שונה, פרט למשפט הראשון והאחרון של כל גירסא של הטקסט.

בטקסטים 1, 2 ו- 3 היו במקביל 46, 38 ו- 50 מקומות ריקים. מנוסחת קלות הקריאה של פלש הופק גם מספר המעיד על קושי - ככל שהמספר גבוה יותר, כן קשה יותר הטקסט בד בבד עם כימות קושי הטקסט, נערך גם ניתוח שיח של האירגון הריטורי או הלכידות של הטקסט, בתקווה שטכניקות של חקר-השיח תגלינה דגמים הניתנים לזיהוי ברור.

תיפקודי המשפט סומנו על-פי קטגוריות של סוגי משפטים שמציעים הורן (Horn 1971), ג'ונס ופוקנר (Jones and Faulkner 1971), ולארסון (Larson 1971). כוחן האילוקוציוני של פיסקאות נקבע על-פי הקטגוריות שמציינים אוסטן (Austin 1962), ווילקינס (Wilkins 1976), ומנבי (Munby 1978).

במחקר הנוכחי משמש המונח "כוח אילוקוציוני" לתיאור תיפקוד הפיסקה ברמת המאקרו, בעוד המונח, "תיפקוד המשפט" מוגבל לרמת המיקרו (המשפט).

חלוקה דיאגרמית של טקסט מס.2 לפי תיפקודים ותפיסות לגבי כל משפט ופיסקה מופיעה בנספח ג', טבלה 6.

## III. דרכי-העבודה.

### א. סקירה כללית והנחות-יסוד.

כדי למדוד את השפעתם המצטברת של מאפיינים שונים של הקישוריות והלכידות, הוכנסו שינויים בשישה טקסטים ונערכה השוואה בין הגירסאות השונות. בחלקו העיקרי של המחקר נבחנו הסטודנטים במבחני רב-ברירה וקלוז. (ראה נספח ב' ובו דוגמה לטקסט 2 המקורי, ארבע גירסאות בעלות שאלות רב-ברירה, ושתי גירסאות קלוז). כמו-כן נותחו גירסאות הטקסט בנפרד על-פי נוסחת קלות הקריאה של פלש ועקרונות חקר-השיח.

### ב. ארגון המחקר ואיסוף הנתונים.

#### 1. הנבחנים.

מבחני רב-ברירה נערכו לכ- 3,600 תלמידי שנה א' באוניברסיטת חיפה. מבחני הקלוז ניתנו ל- 186 סטודנטים. מרבית הסטודנטים היו דוברי עברית או ערבית כשפת-אם.

המחקר הנוכחי נערך במשך תקופה של חמש שנים (1978-82). הבחינות ניתנו כבחינות אמצע שנה וסוף שנה במחלקה לשפות זרות במסגרת קורס החובה בהבנת הניקרא באנגלית כשפה זרה ברמה המתקדמת.

נערכו 27 מבחני רב-ברירה, שכללו 24 גירסאות של ששת הטקסטים השונים, ובנוסף להם גם שלוש מתוך הגירסאות המקוריות וה"בלתי מעובדות". נערכו גם שישה מבחני קלוז. משך כל בחינה היה שעתיים.

## ד. מדידת קריאות הטקסט

אין הסכמה בקרב החוקרים באיזו מידה ניתן לחזות על-פי אורך המשפט והמילה, שהם גורמים הכלולים בנוסחאות הקריאות, מה יהיה הקושי בקריאה. לכן היה צורך להשתמש בדרכים נוספות למדידת הקושי.

אחת השיטות למדידת הקריאות הוא הליך הקלוז ( cloze ), שהוא מחיקה באקראי של מלים מתוך הטקסט כדי לעמוד על יכולת הלומד להבין טקסט זה.

חוקרים מספר טוענים שהקלוז המקרי איננו תקף תמיד באופן אוטומאטי כהליך של בחינה. שיטות מחיקת מלים בדרך ההיגיון ובהתאם לעקרונות בלשניים הציעו וויבר (Weaver 1962), גרין (Greene 1965), אלדרסון (Alderson 1969), קרני (Cranney 1972-73), וקליין-בראלי (Klein-Braley 1981).

במחקר הנוכחי משתמשים בקלוז הגיוני, כשהמחיקות נקבעות על-פי קני-המידה שקבע גרין (1965) על יסוד עודפות מספיק כדי שהקורא המיומן שהאנגלית היא שפת אימו יוכל להבין את הטקסט.

מבחני שאלות ברירה הם סוג מבחן של הבנת הניקרא שבו נמסרות התשובות האפשריות לסטודנט מראש. קיים קשר משוער בין הבנת הסטודנטים את הטקסט לבין יכולתם להשיב על שאלות המבוססות עליו, (Davies 1968, Carroll 1972, Kintsch and Vipond 1977).

לסיכום, במחקר הנוכחי שימשו טכניקות שונות, בתקווה שיחד ניתן יהיה לקבל באמצעותן תמונה כללית של הסיבות לקשיי קריאה אצל לומדי שפה זרה ברמה המתקדמת.

ב. המערכת הלשונית: מרכיבים תיפקודיים - סמאנטיים - ההתפתחות הפרופוזיציונית

1) לכידות (מעט רימוז גלוי, או היעדר רימוז כזה)

  א) ריכוז מידע - מיקרו-פרופוזיציות ומאקרו-פרופוזיציות

  ב) סדר המידע - ארגון רצף הפרופוזיציות (מידע נתון/חדש)

  ג) פיענוח המידע - פעולות דיבור / פעולות אילוקוציוניות / תיפקודי המשפט

2) קישוריות (רימוז גלוי)

  א) דקדוקית

  ב) לקסיקאלית

מודל זה מבוסס על עבודותיהם של האלודיי וחסן (1976), ון-דייק (1976) ווידווסון (1978).

ג. תהליך הבנת הניקרא

מן המודל שהיצגנו לעיל, ניתן לראות את הלכידות והקישוריות ביחס לתהליך הקריאה בכללותו. אנו מניחים כי "הקריאה היא ארגון מחדש של המשמעות" (Goodman 1972). לתהליך הקריאה שני היבטים - הקורא והטקסט. על הקורא מוטל להבין ולפרש את הטקסט.

כשאנו משתמשים במודל של הבנת הניקרא, אנו מניחים כי בעיותיהם של לומדי אנגלית כשפה זרה ברמה המתקדמת זהות, עקרונית, לבעיותיהם של הקוראים דוברי האנגלית המיומנים פחות, הגרועים או שאינם קוראים קריאה רהוטה.

### 3. הקישוריות

בקישוריות הטקסט כלולים קשרים בין משפטים המובעים בגלוי. הקישוריות היא תופעה השייכת לרמת פני-השטח (Beaugrande 1980, Halliday and Hasan 1976, Grimes 1978). הסיווג לקטגוריות המשמש במחקר הנוכחי מבוסס על חלוקתם של האלודיי וחסן (1976), וכלולים בו:

קישוריות דקדוקית אנאפורית (שמות-גוף, המרה והשמטה) וקישוריות לקסיקאלית (חזרה, מלים נרדפות, שמות-עצם כלליים ומלים כלליות).

### 4. מודל השיח

א. יסודות חוץ-לשוניים: מרכיבים סיטואציוניים-סמאנטיים - תוכן פרופוזיציוני

1) מסגר(ו)ת ההקשר של הקורא

א) הנושא

ב) תפיסות ברמת הפיסקה - מידע מעולם המציאות (גלוי/מרומז).

2) כוונת המחבר

## ג. ארגון הטקסט - חקר השיח.

### 1. ביצוע המשמעות כטקסט.

מרבים להבחין בין משמעויות (כגון - רעיונות, פרופוזיציות ומבני-עומק) לבין צורות פני-השטח שהן לובשות, או התגלמותן במשפטים (Brown 1976, Wilkins 1976). ניתן להניח שאפשר לכתוב טקסטים שונים, המייצגים נוסחים שונים של שיח מסויים, דהיינו - קיום מספר אפשרי של טקסטים שניתן לכתוב אותם ולהביע באמצעותם אותם רעיונות עצמם (van Dijk and Kintsch 1977, Lyons 1977, Brown 1976, Halliday 1971, Schnotz 1983, Widdowson 1980). עם זאת יכול להיות שוני בפעולות האילוקוציוניות. במחקר הנוכחי ישמשו נוסחים שונים של טקסט שהוכנסו בהם שינויים כדי להשוות הבדלים ביניהם בלכידות ובקישוריות.

### 2. הלכידות.

בלכידות כלולים, הן קשרים אילוקוציוניים והן פרופוזיציות (Widdowson 1979). הקישוריות, היא הקובעת את מידת חדיקותו של השיח (Beaugrande 1980; van Dijk 1977 and 1980). קיימים ארבעה תנאים הקובעים את הלכידות: (Canale 1982) התפתחות, רציפות, איזון ושלמות.

במחקר זה יתמקד העניין בהיבט אחד של הלכידות, והוא - הרצף וההתפתחות של רעיונות. ניתן לבדוק את הלכידות, הן ברמת המיקרו (הרמה המקומית, או רמת המילה / הפסוקית (המשפט), והן ברמת המאקרו (הרמה הכוללת, או רמת הפיסקה / הטקסט)

### ד. השאלות המוצגות במחקר.

1. האם מהות הלכידות גורם העשוי להשפיע על הבנת הניקרא? האם גורם רצף מידע מסויים לקושי הבנה רב יותר מאשר רצף אחר?

2. האם גורמים מאפייני קישוריות מסויימים לקושי בהבנת הניקרא? מהו ערכה היחסי של הקישוריות הלקסיקאלית לעומת הקישוריות הדקדוקית כמכשול בדרך להבנה?

### ה. חשיבות המחקר.

ייעשה ניסיון להעמיד לרשות החוקרים מיגוון של אמצעים העשויים לסייע בידם להעריך את קושי הטקסט. כמה ממימצאי המדירה בהוראה, הפסיכולינגויסטיקה וחקר-השיח ייושמו במחקר, בניסיון לקבוע את חשיבות הקישוריות והלכידות בהבנת הניקרא אצל סטודנטים ישראלים הלומדים אנגלית כשפה זרה ברמה המתקדמת.

## II. סקירת מחקרים קודמים והטעם לעריכת המחקר הנוכחי.

### א. קריאות הטקסט.

אפשר לאייך ולמדוד קושי בקריאה בדרכים רבות ושונות, בין היתר בשל אופיו של תהליך הקריאה עצמו, השונה אצל קוראים שונים בנסיבות שונות.

אחת הדרכים לטפל בנושא קושי הטקסט היא להשוותו עם מושג הקריאות. במסגרת מחקר זה נבחרה לשימוש נוסחת קלות הקריאה של פלש (Flesch) (Klare 1963).

קלות הקריאה = $206.835 - .846\ wl - 1.015\ sl$

wl = מספר ההברות לכל 100 מלים

sl = המספר הממוצע של מלים במשפט.

הקישוריות פועלת, הן ברמת המיקרו של הטקסט והן ברמת המאקרו שלו. היא מבוססת על מלים המקשרות בין פרופוזיציות כדי ליצור יחידת טקסט שלמה אחת.

### ב. גישותיהם של מורים ותלמידים ללכידות ולקישוריות.

לצורך המחקר הנוכחי נערך סקר מוקדם כדי לעמוד על דעתם של מורים ותלמידים לאנגלית כשפה זרה באוניברסיטת חיפה באשר לקושיים ולחשיבותם של היבטים שונים של הלכידות והקישוריות, יחסית לגורמים אחרים בהבנת הנקרא. נתקבלו תשובות מ- 105 סטודנטים ו- 16 מורים

הסטודנטים ראו מאפיינים אלה כקשים למדי ובעלי חשיבות בקריאה, וכסיבות אפשריות לקושי בקריאה.

רבים מהמורים לאנגלית כשפה זרה אמנם ראו מאפיינים אלה כחיוניים להבנת הנקרא, אך לא סברו בהכרח שהם עלולים להוות מכשול להבנה.

המחקר הנוכחי ינסה לגלות אם גורמים מאפיינים אלה לקשיים, ואם תהיה התשובה חיובית, יתוארו בו דרכים שבאמצעותן יכולים המורים לסייע לתלמידיהם לגבור על קשיים אלה.

### ג. מטרות המחקר הנוכחי.

נבחן שני היבטים של השיח - הלכידות והקישוריות - ונשתמש במספר טקסטים כדי לקבוע כיצד והאם גורמים מאפיינים אלה לקושי בהבנת הניקרא אצל סטודנטים ישראלים הלומדים אנגלית כשפה זרה. נוסף על כך ייבדקו דרכים שונות להערכת הקושי של הטקסטים, ויתרונותיהן וחסרונותיהן של דרכים אלה.

# היבטים של קוהזיה (קישוריות) וקוהרנטיות (לכידות) בתוך הקשר - בחינת הסיבות לקשיים שבהם נתקלים הסטודנטים הישראלים בעת קריאת טקסטים באנגלית

מרשה בן-שושן

## I. בעיותיהם של סטודנטים ישראלים בקריאת אנגלית.

### א. זיהוי גורמים העושים טקסט לקשה.

תלמידי שנה א' באוניברסיטאות בישראל נתבעים לקרוא חלק גדול מן המאמרים והטקסטים של חומר-הלימוד שלהם באנגלית, כדוגמת סטודנטים באותה רמה בארצות דוברות האנגלית. הסטודנטים הישראלים שהאנגלית היא לשונם השניה (אצל דוברי-עברית מלידה) או השלישית (אצל דוברי ערבית מלידה ) נתקלים בקשיי קריאה מורכבים ביותר.

לא ברור מדוע רואים הסטודנטים טקסטים מסויימים כקשים יותר מטקסטים אחרים. במחקרים שנערכו לאחרונה נבדקו המבנה והתוכן של כלל הטקסט או השיח, ולא משפטים בודדים או דוגמאות נבחרות מתוך הטקסט.

אותם היבטים של סידרת משפטים או מבעים שבגללם נתפסת הסידרה כשיח שלם ומקושר מעניקים לה 'קוהרנטיות' (לכידות). במחקר הנוכחי ייבדק היבט יחיד של הלכידות - הדרך שבה מעצב רצף המשפטים בשיח שבכתב את דמות אותו שיח.

הקשרים שבין הרעיונות בשיח מסויים עשויים לזכות לסימון מפורש בדמות שמות-גוף, חזרה, מלים נרדפות וכו', המשמשים כתמרורים במבנה השיח שבאמצעותם מצהיר הכותב במפורש על הקשר בין המשפטים.

מלים כגון אלה קרויות סמני 'קוהזיה' (קישוריות).

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ב. המיגבלות יז

ג. יישומים אפשריים יח

ד. הצעות למחקר נוסף יח

ה. מסקנות כלליות יט

נספח ג': טבלאות 1, 6, 14, 15, 18, 19, 21, 26 כ

(נספחים א' ו- ב' בעמודים 240-263)

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א. עיבוד השיח יא
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א. סיבה לקושי בהבנת הניקרא טו
ב. קישוריות דקדוקית לעומת קישוריות לקסיקאלית טו
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עבודה זו נעשתה בהדרכתם של

פרופ' א. ד. כהן

פרופ' א. א. לבנסטון

# היבטים של קוהזיה (קישוריות) וקוהרנטיות (לכידות)
# בתוך תקשר - בחינת הסיבות לקשיים שבהם נתקלים
# הסטודנטים הישראלים בעת קריאת טקסטים באנגלית

חיבור לשם קבלת תואר דוקטור לפילוסופיה

מאת מרשה בן-שושן

הוגש לסינט האוניברסיטה העברית ביום 10/6/84

# היבטים של קוהזיה (קישוריות) וקוהרנטיות (לכידות) בתוך הקשר - בחינת הסיבות לקשיים שבהם נתקלים הסטודנטים הישראלים בעת קריאת טקסטים באנגלית

חיבור לשם קבלת תואר דוקטור לפילוסופיה

מרשה בן-שושן

הוגש לסינט האוניברסיטה העברית ביום 10/6/84